ACADEMICREGULATIONS

(R-22)

For the

Bachelor of Technology

(B. Tech)

WitheffectfromtheAcademicyear2022-23

VIDYAJYOTHIINSTITUTEOFTECHNOLOGY

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Definitions of Key Words

Academic Year: An academic year is referred to as the period consisting of two consecutive semesters ,each with16 -18 weeks(90instructionaldays)followed by semester examinations.

Course: A plan of study of a particular subject leading to an examination. All the courses need not carry the same weightage. A course may be designed to comprise of lectures/ tutorials/laboratory work/fieldwork/outreachactivities/projectwork/viva/seminars/assignments/presentationsetc.oracombinationofsomeofthese.

Choice Based Credit System (CBCS): Choice Based Credit System (CBCS) is the programme in which the students have a choice to choose from the prescribed courses and the entire assessment is graded based on a credit system.

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

Grade Point: It is a numerical weight allotted to each letter Grade on a10-point scale.

Credit: A unit of measurementofcoursework.Itdeterminesthenumberofhoursofinstructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.

Credit Point: It is the product of Grade Point and Number of Credits for a course.

Semester Grade Point Average (SGPA): SGPA stands for Semester Grade Point Average; a score awarded to students based on how well they have fared in their course work at the end of each semester .It is the ratio of total credit points secured by a student in the courses registered in a semester and the total course credits of that semester. It shall be expressed up to 2nd decimal place.

Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performance of a student in all the semesters. CGPA is the ratio of total credit points secured by a student in various coursesinall semestersandthesum of the total creditsof allcoursesinall thesemesters.Itisexpressedupto2nd decimalplace.

Programme: An Educational Programmeleadingtotheaward ofaDegree.

B.Tech.with Minordegree:

A student will be eligible to get B. Tech. with Minor Degree, if he/she acquires 18 additionalcredits.These should be acquired through registered courses offered by the Institution or throughMOOCsas equivalenttothecoursesofferedbytheInstitute.

B.Tech(Honors)

The B. Tech. (Honors) programs are proposed to choose for an area of specialization amongvarious emerging technologies in order to be a domain expert. A student will be eligible for B.Tech. (Honors) Degree, if he/she acquires an additional 20 credits. These should be acquiredthrough registered courses as per the respective courses offered by the Department/Institute orthroughSWAYAMMOOCs asequivalenttothecoursesofferedbythe Institute.

Transcript or Grade Card: Based on the grades earned, a grade certificate shall be issued to allthe registered students after every semester. The grade card will be displaying the course details(code, title, number of credits, grade secured) along with SGPA of that semester and CGPAearnedtillthatsemester.

Types of Courses: The Courses in/under B. Tech Program may be of three kinds' viz., Core,ElectiveandMandatory.

a) CoreCourse:-

There may be a Core Course in every semester and are to be compulsorily studied by a studentandis essentialrequirementforagivenProgramme.

b) ElectiveCourse:-

ElectiveCourseisacoursewhichcanbechosenbythestudentsfromapoolofCourses.Ingeneral,theelectivecourseis:

- Supportive tothedisciplineofstudy
- Providesanexpandedscopeofthecorecourses
- Nurturesstudent'sproficiency/skill

In case an elective is "Discipline centric" and is offered by the student's department itself, theelective is called **Professional elective**. On the contrary, if the elective is offered by otherdepartments wherein the students are at liberty to choose a course of their interest, the elective iscalledan"**OpenElective**."

c) MandatoryCourses(Non-CreditCourses)

AICTE considers that the Course work pertaining to certain subjects is essential and a' **pass** inthose subjects is compulsory as such for the award ofB.Tech degree. Such types of courses arereferred to as Mandatory **courses**. As AICTE feels that familiarity with the subject content ofthese coursesissufficient,butessential,only apassin each of these coursesis required.Therefore,these subjectsare includedinthe curriculumasnon-Creditcourses.

VIDYAJYOTHIINSTITUTEOFTECHNOLOGY

(AnAutonomousInstitution)

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ACADEMICREGULATIONSFORB.Tech.

WITHEFFECTFROMACADEMICYEAR2022-23(R22)

1 Under-

GraduateDegreeProgrammeinEngineering:VidyaJyothiInstituteofTechnologyoffersa4Year(8Semesters)**BachelorofTechnology**(B.Tech.)Degreeprogramme,underChoiceBasedCreditSystem(CBCS)inthefollowingBranchesofEngineering.

S.No	Branch
1.	CivilEngineering
2.	ElectricalandElectronicsEngineering
3.	MechanicalEngineering
4.	ElectronicsandCommunicationEngineering
5.	ComputerScienceandEngineering
6.	Informationtechnology
7.	ArtificialIntelligence
8.	ComputerScienceand Engineering(DataScience)
9.	ArtificialIntelligence&DataScience
10.	ComputerScience&Engineering(AI&ML)

Regulationsapplicableto anynewcoursesintroduced inlateryears

2 ELIGIBILITYFORADMISSION

2.1 Admission to the Under Graduate (UG) program shall be made either on the basis of themerit rank obtained by the candidate in the entrance test conducted by the Telangana StateGovernment (TS EAMCET) and on the basis of any other order of merit approved by theGovernmentfromtimetotime,includingadmissionsunderManagement/NRICategory.

2.2 TheGovernmentorderswithregardtotheadmissionsinvogueshallprevail.

2.3 The candidate should have passed the prescribed qualifying examination before the date ofAdmission.

2.4 Themediumofinstructionis**English**.

3 B.TechPROGRAMMESTRUCTURE

3.1 A student after securing admission shall complete the B.Techprogramme in a minimumperiod of **four** academic years (8 semesters), and a maximum period of **eight** academicyears (16 semesters) starting from the date of commencement of First year First semester,failingwhichthestudentshallforfeitseatinB.TechProgramme. Eachstudentshall secure 160 credits(withCGPA≥5),requiredforthecompletionoftheUnderGraduate Programme andtheawardoftheB.Tech.Degree.

3.2 UGC/ AICTE specified definitions/ descriptions are adopted appropriately for varioustermsand abbreviationsusedintheseacademicregulations/normsarelistedbelow.

3.2.1 SemesterScheme

All UnderGraduate Programmeis of 4 academicyears (8 semesters).Every academicyear shall be dividedinto two regular semesters known as the firstsemester and thesecondsemester.EverySemesterhas-

'ContinuousInternalEvaluation(CIE)'and'SemesterEndExamination(SEE)'underChoiceBasedCreditSystem(CBCS)asindicated by UGC, and the Curriculum/ Course structure as suggested by AICTE arefollowed.

3.2.2 CreditCourses

All Subjects/Courses are to be registered by the student in a semester to earn credits whichshall be assigned to each Subject/Course in a L: T: P: C (lecture periods: tutorial periods:practicalperiods:credits)structure basedonthe followinggeneralpattern.

- One credit for one hour/ week/ semester for one Theory/ Lecture (L) courses orTutorials(T)and,
- Onecreditfortwohours/week/semesterforlaboratory/practical(P)Courses.

Courses like Gender Sensitization, Environmental Science, Induction Program are mandatorycourses.Thesecourses willnotcarryanycredits.

3.2.3 Subject/CourseClassification

TheCollegehasfollowedalmostalltheguidelinesissuedbyAICTE/UGC.AllSubjects/CoursesofferedfortheUGProgrammesinEngineering(B.Tech.)arebroadly

classifiedasfollows.

ThegroupsofthesubjectsshallbeasgiveninthetablehereunderassuggestedbyAICTE.

S. No.	SubjectCategories
1	HumanitiesandSocialSciences(HS) Subjects: English, Management and the Courses dealing with PersonalityDevelopment
2	BasicSciences(BS)SubjectsincludingMathematics,PhysicsandChemistry
3	Engineering Sciences (ES): Engg. Workshop, Drawing, Fundamentals ofComputerScienceandCoursesdealingwiththebasicsofElectrical/Electronics/MechanicalEngineering
4	ProfessionalCore(PC)Subjects:Includescorecoursesrelatedtotheparentdiscipline /department/branchofEngineering
5	ProfessionalElective(PE)Subjects:Includeselectivecoursesrelatedtothe parent discipline / department / branch of engineering. Students has anoptiontoselectamongsttheofferedcourses
6	OpenElective(OE)Subjects:Electivecourseswhichincludeinter–disciplinarycoursesorcoursesinanareaoutsidetheparentdiscipline/
7	ProjectWork,Seminarand/orInternshipinIndustryorelsewherealongwithMini project.
8	MandatoryCourses(MC): Mandatorynon-creditcourses
9	**Minor/HonorsCourses** **Honors**: To facilitate the students to choose additional courses by deepdive into emerging areas in their own discipline. The Honors program shallbe offeredbythe parentdepartment. **Minor**:Students,whoaredesirousofpursuingtheirspecialinterestareas otherthantheirbranchofengineering,mayoptforadditionalcoursesin

B.TechYearWisedistribution ofcredits

S.No.	Year	Semester	RegularCurriculum	
			Credits	TotalCredits
1	st 1Year	I	20	**40**
		II	20	
2	nd 2Year	I	20	**40**
		II	20	
3	rd 3Year	I	20	**40**
		II	20	
4	th 4Year	I	20	**40**
		II	20	
TotalNo.ofCredits				**160**

4 COURSEREGISTRATION/DROPPING

4.1 Each studenthas tocompulsorily registerfor course workat the beginning of eachsemester aspertheschedulementionedintheacademiccalendar.Itisabsolutelynecessaryforthe studenttoregisterforCoursesintime.

4.2 A student would be allowed to register for an Additional Course only if the studentsatisfies theprerequisites.

4.3 Departments will notify at the time of registration about the minimum n umber o f students to be enrolled for a particular Open Elective to be offered.

4.4 Anystudentmaybebarred fromregisteringfor anycourseondisciplinarygrounds.

4.5 **Open Electives:** The students have to choose three Open Electives (OE-I, II& III) from the list of open electives given. However, the student cannot opt for an Open Elective Subjectofferedbyhis own(parent)department.

4.6 ProfessionalElectives:

Studentshavetoregisterfrom thelistofprofessionalelectivecoursesasprescribedinthe

coursestructureoftheprogramme.

5 ELECTIVECOURSESTOBEOFFERED

5.1 An Elective Course may be offered to the students, only if a minimum of 30 students optforit.

5.2 More thanonefacultymembermayofferthesamesubject(lab/practicalmaybeincluded withthecorresponding theorysubjectinthe same semester)inanysemester.

6 ATTENDANCE REQUIREMENTS

6.1 A studentshall maintain a minimum required attendance of 75% in AGGREGATE.He/She is eligible to write the Semester End Examinations only if the student acquires aminimum of 75% of attendance in class work aggregate of all the Subjects/Courses in thatSemester.

6.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic council on genuine medical grounds, based on the student's representation with supporting evidence. Student shall submit thesame asandwhensuchrequirementarisesbutnotatthe endofsemester.

6.3 Astipulated feeshallbepayabletowardscondonationofattendanceshortage.

6.4 Shortageofattendancebelow65%inaggregateshallinnocasebecondoned.

6.5 Students, whose shortage of attendance is not condoned, are not eligible to appear for SemesterEndExaminationsofthatsemester.Suchstudentsaredetainedandtheir registrationfortheexaminationstands cancelled.

6.6 A student detained due to shortage of attendancein a semester may seek re-admissionintothatsemester,asandwhenoffered,withinfourweeksfromthedateofthecommencement of class work. Academic regulations applicable to the semester in whichre-admission is sought shall be applicable to the re-admitted student. In case if there areany professional electives and/or open electives, the same may also be re-registered ifoffered. However, if those electives are not offered in the later semesters, then alternateelectives maybechosenfromthesamesetofelectivecoursesofferedunder thatcategory.

7 ACADEMICREQUIREMENTS

The following academic requirements have to be satisfied, in addition to the attendancerequirementsmentionedinitemno.6

7.1 A student shall be deemed to have satisfied the academic requirements and earned thecredits allotted to each subject/ course, if a studentsecures notless than 35% (14 marksout of 40 marks in the **Continuous Internal Evaluation**, not less than 35% (21 marks outof60marks)inthesemesterendexamination,andaminimumof40%(40marksoutof 100marks)inthesumtotaloftheCIE(ContinuousInternalEvaluation)andSEE(Semester End Examination) taken together; in terms of letter grades, this implies securing'C'gradeoraboveinthatsubject/course.

7.2 A student shall be deemed to have satisfied the academic requirements and earned thecreditsallotted toReal-timeResearch Project(or)FieldBasedResearch Project(or)Industry Oriented Mini Project (or) Internship (or) Seminar, if the student secures not lessthan40%ofmarksineachofthem.

The studentis deemed to havefailed,if he (i)does notsubmita report on IndustryOriented Mini Project/Internship, or (ii) not make a presentation of the same before theevaluation committee as per schedule, or (iii) secures less than 40% marks in Real-timeResearch Project(or) Field Based Research Project (or) Industry Oriented Mini Project(or)Internshipevaluations.

A student may reappear once for each of the above evaluations, when they are scheduledagain; if the student fails in such 'one reappearance' evaluation also, the student has toreappear forthesameinthenextsubsequentsemester,asand whenitisscheduled.

7.3 Promotionrules

S.No.	Promotion	Conditionstobefulfilled
1	FirstyearfirstsemestertoFirst yearsecondsemester	Regularcourse ofstudyofFirstyearfirstsemester and shallsatisfyattendancerequirements.

2	FirstyearsecondsemestertoSecondyearfirstsemester	**(i)** RegularcourseofstudyofFirstyearsecondsemesterandshallsatisfyattendancerequirements. **(ii)** Must have secured at least 20 credits out of 40 creditsi.e.,50%creditsuptoFirstyearsecondsemesterfromall the relevant regular and supplementaryexaminations,whetherthe student takesthose examinationsornot.
3	Secondyearfirstsemesterto Second yearsecondsemester	RegularcourseofstudyofSecondyearfirstsemesterandshallsatisfyattendancerequirements.
4	Second yearsecondsemestertoThirdyear first semester	**(i)** Regular course of study of Second year secondsemesterandshallsatisfyattendancerequirements. **(ii)** Musthavesecuredatleast48creditsoutof80creditsi.e., 60% credits up to Second year second semesterfrom all the relevant regular and supplementaryexaminations,whetherthe student takesthose examinationsornot.
5	Third year first semester toThirdyearsecondsemester	RegularcourseofstudyofThirdyearfirstsemesterandshallsatisfyattendancerequirements.
6	Third year second semestertoFourthyearfirstsemester	**(i)** Regular course of study of Third year secondsemestershallsatisfyattendancerequirements. **(ii)** Must have secured at least 72 credits out of 120credits i.e., 60% credits up to Third year secondsemester from all the relevant regular andsupplementaryexaminations,whetherthestudent takesthoseexaminationsornot.
7	Fourth year first semester toFourthyearsecondsemester	RegularcourseofstudyofFourthyearfirstsemesterandshallsatisfyattendancerequirements.

7.4 A Student (i) shall register for all Courses/Subjects covering 160Credits as specified andlisted in the course structure, (ii) fulfils all the attendance and academic requirements for160credits,(iii)earnall160creditsbysecuringSGPA≥5.0(ineachsemester),and

CGPA (at the end of each successive semester) ≥5.0, (iv)**passes all the mandatorycourses**, to successfully complete the under graduate programme. The performance of thestudent in these 160 credits shall be taken into account for the calculation of 'the finalCGPA (**at the end of under graduate programme**), and shall be indicated in the gradecard/marksmemoofIV-yearII-semester.

7.5 If a student register for '**extra subjects**' (in the parent department or other department /branchesofEngineering)otherthanthoselistedsubjectstotalingto160creditsasspecified in the course structure of his/her department, the performances in those '**extrasubjects**' (although evaluated and graded using the same procedure as that of the required160 credits) will not be considered while calculating the SGPA and CGPA.For such'**extra subjects**' registered, percentage of marks and letter grade alone will be indicated inthe grade card as a performance measure, subject to completion of the attendance andacademic requirementsasstatedinregulationsItems6and7.1–7.4above.

7.6 A student eligible to appear in the Semester End Examination for any subject/ course, butabsent for it or failed (thereby failing to secure 'C' grade or above) may reappear for thatsubject/ course in the supplementary examination as and when conducted. In such cases,internal marks (CIE) assessed earlier for that subject/ course will be carried over, andaddedtothemarksobtainedintheSEEsupplementaryexaminationforevaluatingperformanceinthatsubject.

7.7 A student detained in a semester due to shortage of attendance may be re-admitted in thesame semester in the next academic year for fulfillment of academic requirements. Theacademic regulations underwhich a studenthas been readmittedshallbe applicable.However, no grade allotments or SGPA/ CGPA calculations will be done for the entiresemesterinwhichthe studenthasbeendetained.

7.8 A student detained due to lack of Credits in any year, may be readmitted after fulfillmentof the Academic Requirements, with the Academic Regulations of the Batch into which hegets readmitted. If there are any Professional Electives/Open Electives, the same may alsobe re-registered if offered. However, if those Electives are not offered in later Semesters,thenalternateElectivesmaybechosenfromthesamesetofElectiveSubjectsoffered

underthatcategory.

7.9 A student detained due to lack of credits, shall be promoted to the next academic yearonly after acquiring the required number of academic credits. The academic regulationsunderwhichthe studenthasbeenreadmittedshallbeapplicabletohim.

7.10 Student, who fails to earn 160 credits as indicated in the course structure within eightacademic years from the year of his/her admission, shall forfeit the seat in B. Tech. courseandadmissionstands cancelled.

7.11 A student with a final CGPA (at the end of the UGP) < 5.00 will not be eligible for theAwardoftheDegree.

8 EVALUATION-DISTRIBUTIONANDWEIGHTAGEOFMARKS

8.1 The performance of a student in every subject/course (including Practicals and ProjectStage – I & II) will be evaluated for 100 marks each, with 40 marks allotted for CIE(ContinuousInternalEvaluation) and 60marksforSEE(Semester End-Examination).

8.2 In CIE, for theory subjects, during a semester, there shall be two mid-term examinations.Each Mid-Term examination consists of two parts i) Part – A for 10 marks, ii) Part – B for20marks withatotaldurationof2hoursasfollows:

1. MidTermExaminationfor30marks:
    a. Part- A:Objective/quizpaperfor10marks.
    b. Part–B:Descriptivepaperfor20marks.

The objective/quiz paper is set with multiple choice, fill-in the blanks and match thefollowing type of questions for a total of 10 marks. The descriptive paper shall contain 6fullquestionsoutofwhich, thestudenthastoanswer4questions,eachcarrying5marks.

While the first mid-term examination shall be conducted on 50% of the syllabus, thesecondmid-termexaminationshallbe conductedonthe remaining50%ofthe syllabus.

Theremaining10marksofContinuousInternalAssessment(outof40) aredistributedas:

1 Assignmentfor5marks. (Averageof2Assignmentseachfor5marks).

Five(5)marksareallocatedforassignments(asspecifiedbythesubjectteacherconcerned). The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct ofthe second mid-term examination. The average of the two assignments shall be taken asthe finalmarksforassignment(for5marks).

2 SubjectViva-Voce/PosterPresentation/ParticipatoryLearning/GroupActivities/CaseStudyonatopicinthe concerned subjectfor5 marksbeforeIIMid-termExamination.

The Student, in each subject, shall have to earn 35% of marks (i.e. 14 marks out of 40marks) in CIE 35% of marks (i.e. 21 marks out of 60) in SEE and however overall 40% ofmarks(i.e.40marksoutof100marks)bothCIEandSEEmarksputtogether.

The student is eligible to write Semester End Examination of the concerned subject, if thestudentscores≥35%(14 marks)of40 ContinuousInternalExamination(CIE)marks.

In case, the student appears for Semester End Examination (SEE) of the concerned subjectbut not scored minimum 35% of CIE marks (14 marks out of 40 internal marks), hisperformanceinthatsubjectinSEEshallstand cancelledinspiteofappearingtheSEE.

ThedetailsofEnd semester questionpaper patternisasfollows:

8.2.1 The Semester End Examinations (SEE), for theory subjects, will be conducted for 60marksconsistingoftwopartsviz.i)Part-Afor10marks,ii)Part-Bfor50marks.

- Part-A is a compulsory question which consists of ten sub-questions from all unitscarryingequalmarks
- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each.Each of these questions is from each unit and may contain sub-questions.For eachquestion there will be an “either” “or” choice, which means that there will be twoquestions fromeachunitandthestudentshouldanswer eitherofthetwoquestions.
- ThedurationofSemesterEndExamination is3 hours.

8.2.2 For the subject, Computer Aided Engineering Graphics, the Continuous Internal Evaluation (CIE)and Semester End Examinations (SEE) evaluation pattern is same as for other theory subjects.

8.3 For practical subjects there shall be a Continuous Internal Evaluation (CIE) during thesemesterfor 40 marks and 60 marksfor semesterend examination.Out of the 40

marksforinternalevaluation:

1. Awrite-uponday-to-dayexperimentinthelaboratory(intermsofaim,components/procedure, expected outcome)which shall be evaluatedfor10marks
2. 10 marks for viva-voce (or) tutorial (or) case study (or) application (or) posterpresentationofthecourseconcerned.
3. Internal practical examination conducted by the laboratory teacher concernedshallbeevaluatedfor10marks.
4. The remaining 10 marks are for laboratory project whichconsists of the Design(or)Software/HardwaremodelPresentation(or)AppDevelopmentorPrototypePresentationsubmissionwhichshallbeevaluatedaftercompletionoflaboratorycourse beforethe semesterendPracticalexaminations.

The Semester End Examination shall be conducted with an external examiner and thelaboratory teacher. The external examiner shall be appointed from other colleges whichwillbedecidedbytheexaminationbranchoftheCollege.

IntheSemesterEndExaminationheldfor3hours, total 60marksaredividedandallocatedas shownbelow:

1. 10marksforwrite-up
2. 15forexperiment/program
3. 15for evaluationofresults
4. 10 marks for presentation on another experiment/program in the same laboratorycourse and
5. 10marksfor viva-voceonconcernedlaboratorycourse

- Thestudent,ineachsubject,shall have toearn35%ofmarks(i.e.14marksout of 40marks) in CIE, 35% of marks (i.e. 21 marks out of 60) in SEE and Overall40% of marks (i.e. 40 marks out of 100 marks) both CIE and SEE marks puttogether.
- ThestudentiseligibletowriteSemesterEndExaminationoftheconcernedsubject, if the student scores ≥ 35% (14 mark out of 40 marks) inContinuousInternalExamination(CIE).

- In case, the student appears for Semester End Examination (SEE) of the concernedsubject but not scored minimum 35% of CIE marks (14 marks out of 40 internalmarks), his performance in that subject in SEE shall stand cancelled inspite ofappearingtheSEE.

8.4 The evaluation of courses having ONLY internal marks in I Year I Semester and IIYearIISemesteris asfollows:

IYearISemestercourse(ex.,ElementsofCE/ME/EEE/ECE/CSE):Theinternalevaluation is for 50 marks and it shall take place during I Mid-Term examination and IIMid-Term examination. The average marks of two Mid-Term examinationsare the final for50 marks. Student shall have to earn 40%, i.e 20 marks out of 50 marks from average ofthe two examinations. There shall be NO external evaluation. The student is deemed tohave failed, if he (i) is absent as per schedule, or (ii) secures less than 40% marks in thiscourse.

For CSE/IT and allied branches the Continuous Internal Evaluation (CIE) will be for 50 marks. Each Mid-Term examination consists of two parts i) Part – A for 20 marks, ii) Part – B for 20 marks with a total duration of 2 hours.

Part A: Objective/quiz paper is set with multiple choice, fill-in the blanks and match the following type of questions for a total of 20 marks. **Part B:** Descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks.

The remaining 10 marks of Continuous Internal Evaluation are for Assignment (5 marks) and Subject Viva-Voce/PPT/Poster Presentation/ Case Study (5 marks) and the evaluation pattern will remain same as for other theory subjects.

For all other branches, the Continuous Internal Evaluation (CIE) will be for 50 marks. Out of the 50 marks for internal evaluation:

a) A write-up on day-to-day experiment in the laboratory (in terms of aim, components/procedure, expected outcome) which shall be evaluated for 10 marks

b) 10 marks for viva-voce (or) tutorial (or) case study (or) application (or) poster presentation of the course concerned.

c) Internal practical examination conducted by the laboratory teacher concerned shall be evaluated for 15 marks.

d) The remaining 15 marks are for Laboratory Report/Project and Presentation, which consists of the Design (or) Software / Hardware Model Presentation (or) App Development (or) Prototype Presentation submission which shall be evaluated after completion of laboratory course and before semester end practical examination.

II Year II Semester Real-Time (or) Field-based Research Project course: The internalevaluation is for 50 marks and it shall take place during I Mid-Term examination and IIMid-Term examination. The average marks of two Mid-Term examinations is the final for50 marks.Student shall have to earn 40%, i.e 20 marks out of 50 marksfrom average ofthetwo examinations.There shallbe NOexternalevaluation.

The student is deemed to have failed, if he (i) does not submit a report on the Project, ordoes not make a presentation of the same before the internal committee as per schedule,or(ii)secureslessthan40%marksinthis course

8.5 Incase,afewstudentsareabsentduetohealthreasonsorany otherunavoidablecircumstances, or if a student wish to improve his/her performance in the internal marks athirdmid-termexaminationwillbeconductedonpaymentoffeesfixedbytheexaminationbranch.The testwillbe conductedinallthe unitsofthe subject.

8.6 There shall be an Industry training / Internship / Skill Development Courses / Paperpresentation in reputed journal / Industry Oriented Mini Project in collaboration with anindustry of their specialization. Students shall register for this immediately after II-Year IISemesterExaminationsandpursueitduringsummervacation/semesterbreak&duringIIIYear without effecting regular course work. Internship at reputed organization/ Skilldevelopmentcourses / Paper presentation in reputed journal / Industry Oriented MiniProject shall be submitted in a report form and presented before the committee in III-YearIIsemesterbeforeEnd SemesterExamination.Itshall be evaluatedfor100 external marks. The committee consists of an External Examiner, Head of the Department, InternalSupervisor and a Senior Faculty Member of the Department. There shall be NO internalmarks for Industry Training (or)Internship (or) Mini-Project (or) Skill DevelopmentCourses(or)PaperPresentationinreputedjournal(or)IndustryOriented MiniProject

8.7 DesignandDrawing

Forthesubjecthavingdesignand/ordrawing,(suchasEngineeringGraphics,EngineeringDrawing,andMachineDrawing),thedistribution shallbe 40marksforInternal Evaluation (20 marks for day-to-day work and 20 marks for internal tests) and 60marks for Semester End Examination. There shall be two internal tests in a semester andaverage of two examinationsshall be considered for the award of marks for internalexamination.

8.8 The UG project shall be initiated at the end of the IV Year I Semester and the duration

ofthe project work is one semester. The studentmust present Project Stage– I during IVYear I Semester before II Mid examinations, in consultation with his Supervisor, the title,objectiveandplanofactionofhisProjectworktothedepartmentalcommitteeforapproval before commencement of IV Year II Semester.Only after obtaining the approvalofthedepartmentalcommittee,the studentcanstarthis projectwork.

8.9 UG project work shall be carried out in two stages: Project Stage – I for approval ofproject before Mid-II examinations in IV Year I Semester and Project Stage – II during IVYear II Semester. Student has to submit project work report at the end of IV Year IISemester. The project shall be evaluated for 100 marks before commencement of SEETheoryexaminations.

8.10 For Project Stage – I, the departmental committee consisting of Head of the Department,project supervisor and a senior faculty member shall approve the project work to beginbefore II Mid-Term examination of IV Year I Semester. The student is deemed to be noteligible to register for the Project work, if he does not submit a report on Project Stage - Iordoesnotmakeapresentationofthesamebeforetheevaluationcommitteeasper schedule. A student who has failed may reappear once for the above evaluation, when it isscheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappearforthesameinthenextsubsequentsemester,asand when itisscheduled.

8.11 For Project Stage – II, the external examiner shall evaluate the project work for 60 marksand theinternal projectcommittee shall evaluate itfor 40 marks. Out of 40internalmarks,thedepartmentalcommitteeconsistingofHeadoftheDepartment,ProjectSupervisor and a Senior Faculty Member shall evaluate the project work for 20 marks andProject Supervisor shall evaluate for 20 marks. The topics for Industry Oriented MiniProject/ Internship/SDC etc. and the main Project shall be different from the topic alreadytaken. The student is deemed to have failed, if he (i) does not submit a report on theProject, or (ii) does not make a presentation of the same before the External Examiner asper schedule, or (iii) secures less than 40% marks in the sum total of the CIE and SEEtakentogether.

For conducting viva-voce of project, Principal/Director of the college selects an externalexaminer from the list of experts in the relevant branch submitted by the Head of theDepartment.

Astudent,whohasfailed,may reappearoncefortheaboveevaluation,whenitisscheduled again; if student fails in such 'one reappearance' evaluation also, he has toreappear forthesameinthenextsubsequentsemester,asand whenitisscheduled

8.12 SeminarPresentation

There shall be a seminar presentation in IV-year II Semester. For the seminar, the studentshall collect the information on a specialized topic and prepare a technical report, showinghis understanding of the topic, and submit it to the department. It shall be evaluated by thedepartmental committee consisting of Head of the Department, Seminar Supervisor and aSenior Faculty member. The seminar report shall be evaluated for 100 marks. There shallbenoSEEorexternalexaminationforthe seminar.

If the student fails to present the Seminar as required in the IV-year II Semester He mayreappear for the seminar when they are scheduled again (within one month); if he fails insuch 'one reappearance' evaluation also, he has to reappear for the same in thenextsubsequentSemester,asandwhenitis scheduled.

8.13 A student shall be given one time chance to re-register for a maximum of two subjects: ina semester

- If theinternal marks secured by a studentin the**continuous internal evaluationmarks for 40** (Sum of average of two mid-term examinations consisting of objective&descriptiveparts,averageof2assignmentsandsubjectvivavoce/PPT/Posterpresentation/Case study on a topic in the concerned subject) are less than 35% andfailedinthosesubjects

A studentmustre-register for the failed subject(s) for 40 marks within four weeks ofcommencementoftheclassworkinnextacademicyear.

In the event of the student taking this chance, his Continuous Internal Evaluation marks for40 and Semester End Examination marks for 60 obtained in the previous attempt standcancelled.

Subject	InternalValuation Marks	External ValuationMarks	TotalMarks
Theory/Engineering Drawing	40	60	100
MiniProject	0	100	100
Seminar	100	0	100
MajorProject	40	60	100

8.14 Candidates shall be permitted to apply for recounting/revaluation of SEE scripts within 2weeksfromthe dateofreleaseofresults,withapaymentofprescribedfee.

8.15 NomarksorlettergradesshallbeallottedforMandatory/Non-CreditCourses.OnlyPass/FailshallbeindicatedinGradeCard.

9 B.TechwithMinorProgram

The Institution has introduced the **Bachelor of Technology in a particular specializationwith minor program** *(For eg., B. Tech. in Electronics & Communication EngineeringwithMinor inAI&ML)*fromAY.2021-22.

The Bachelor of Technology (B.Tech.) with minor programs offered by VJIT focuses onthe fundamental principle of Engineering, where the development of critical & analyticalthinking and the ability to develop a distinctive approach to any given problem statementshallbe the drivingfactorthatfuels the pedagogicdiscourse.

A student will be eligible to get B. Tech. with Minor Degree, if he/she completes anadditional 18 credits. These should be acquiredthrough registered courses as per therespectivecoursesofferedbytheInstituteorthroughMOOCs coursesasmentionedAnnexure-I,asequivalenttothe courses offeredbythe Institute.

DetailsaregivenintheAnnexure–I

10 B.Tech(Honors)

The B. Tech. (Honors) programs are proposed to choose for an area of specializationamong various emerging technologies in order to be a domain expert. A student will beeligible to get B. Tech. (Honors) Degree, if he/she completes an additional 20 credits.These should be acquired through registered courses as per the respective courses offeredby the institution or through SWAYAM MOOCs as equivalent to the courses offered bythe Institute.

Detailsaregivenin theAnnexure-II

11 GRADINGPROCEDURE

11.1 Grades will be awarded to indicate the performance of students in each theory subject,laboratory/practical's/Seminar/IndustryOrientedMiniProject/InternshipandProject Stage –I &II. Based on the percentage of marks obtained (Continuous Internal EvaluationandSemester End Examination, both taken together) as specified item7 and 8 of above, acorrespondinglettergrade shallbegiven.

11.2 Asameasureofthestudent'sperformance,a10-pointAbsoluteGradingSystemusingthefollowingLetterGradesandcorresponding percentageofmarksshallbefollowed.

Letter Grade	Performance	Grade Points	%ofmarksSecured(ClassIntervals)
O	Outstanding	10	Greaterthanorequalto90%
A+	Excellent	9	80%andlessthan90%
A	Very Good	8	70%andlessthan80%
B+	Good	7	60%andlessthan70%
B	Average	6	50%andlessthan60%
C	Pass	5	40%andlessthan50%
F	Fail	0	Below40%
AB	Absent	0	Absent

11.3 AStudentwhohasobtainedan**'F'**gradeinanysubjectshallbeconsidered'failed'andis required to reappear as a 'supplementary student' in the semester End Examination asand when conducted. In such cases, Internal Marks in those subjects will remain the sameasthoseobtainedearlier.

11.4 To a student who has not appeared for a semester end examination in any subject, **'Ab'**grade will be allocated in that subject, and he is deemed to have **'failed'**. A Student will berequired to reappear as a 'Supplementary Student' in the Semester End Examination, asand when conducted. In this case also, the internal marks in those subjects will remain thesame as thoseobtainedearlier.

11.5 A letter grade does not indicate any specific percentage of marks secured by the student,butitindicatesonlytherange ofpercentageofmarks.

11.6 In general, a student shall not be permitted to repeat any subject/course(s) only for thesake of 'Grade Improvement' or 'SGPA/CGPA Improvement'. However, he has to repeatall the Subject/Courses pertaining to that Semester when he is detained due to shortage ofattendance.

11.7 A student earns grade point (GP) in each subject/ course, on the basis of the letter gradesecuredinthatsubject/course.Thecorresponding'creditpoints'(CP)arecomputedby multiplyingthegradepointwithcreditsforthatparticularsubject/course.

Creditpoints(CP)=gradepoint(GP)xcredits….Forasubject/course

TheGradePointAverage(GPA)willbecalculatedaccordingtotheformula:

$$GPA=\frac{\sum C_i G_i}{\sum C_i}$$

Where C_i= Number of credits allotted to the i^{th} Subject and G_i= Grade points allotted for allcoursespassedinthatsemester

11.8 ThestudentpassestheSubject/ CourseonlywhenhegetsGP ≥5(P Gradeorabove).

11.9 The Semester Grade Point Average (SGPA) is calculated by dividing the sum of creditpoints (∑CP) secured from all subjects/ courses registered in a semester, by the totalnumber of credits registered during that semester. SGPA is rounded off to two decimalplaces.SGPAis thus computedas

$$SGPA=\frac{\sum \text{CourseCredits}(C_i)\times\text{GradePoints}(G_i)}{\sum \text{Course Credits }(C_i)}$$

WhereC_i=Numberofcredits allottedtothe i^{th}Course

G_i=Gradepointsallottedtoi^{th}Coursepassedinthatsemester

$\sum C_i$=Totalnumberofcreditsfor allcoursesregisteredinthatsemester

And'i' isthecourseindicator index(takesintoaccountallcourses inasemester).

11.10 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulativeperformance of a studentin all semesters considered for registration. The CGPA is theratio of the total credit points secured by a student in all registered courses in all semesters,and the total number of credits registered in all the semesters. CGPA is rounded off to twodecimalplaces.CGPAisthuscomputedfrom theIyearIIsemesteronwardsattheendof eachsemesterasperthe formula

$$CGPA = \frac{\sum \text{Course Credits}(C_j) \times \text{GradePoints}(G_j)}{\sum \text{CourseCredits } (C_j)}$$

Where

C_j=NumberofcreditsallottedtothejthCourse

G_j=GradepointsallottedtojthCoursepassedup tothatsemester

$\sum C_j$=Totalnumberofcreditsfor allcoursesregistereduntilthatsemester

And'j'isthesubjectindicatorindex(takesintoaccountallsubjectsuntilthesemester)

AfterregistrationandcompletionofIyearIsemester,theSGPA ofthatsemesteritselfmaybetakenas theCGPA,astherearenocumulative effects.

IllustrationofcalculationofSGPA:

Course	Credits	LetterGrade	GradePoints	CreditPoints
Course1	4	A	8	4x8=32
Course2	4	O	10	4x10=40
Course3	4	C	5	4x5=20
Course4	3	B	6	3x6=18
Course5	3	A+	9	3x9=27
Course6	3	C	5	3x5=15
	21			152

SGPA =152/21=7.24

11.11 llustrativeExample:

An illustrative example given in below Table indicates the use of the above two equations incalculating SGPA and CGPA, both of which facilitate the declaration of academic performance ofa student, at the end of a semester and at the end of successive semesters respectively. Both ofthem shall be normally calculated up tothe second decimal position, so that the*CGPA*,inparticular, can be made use of in awarding a rank for the student's performance in a class orcollege. If two students get the same *CGPA*, the tie should be resolved by considering the numberoftimesastudenthasobtainedhigher*SGPA;*But,ifitisnotresolvedevenatthisstage,the numberoftimesastudenthasobtainedhighergradeslikeO,A, Betcshallbetakenintoaccountinrankorderingofthe studentsinaclass.

Example:

Yearand Semester	Course No.	Credits	Grade	Grade Points	Credit Points
IYearI Semester	XX101	5	A	8	40
IYearI Semester	XX102	4	F	0	00
IYearI Semester	XX103	3	A+	9	27
IYearI Semester	XX104	4	F	0	00
IYearI Semester	XX105	5	C	5	25
IYearI Semester	XX106	5	A	8	40
Total		26(18*)			132
SGPA=132/26=5.08CGPA=5.08					
IYearIISemester	XX107	5	B+	7	35
IYearIISemester	XX108	4	A	8	32
IYearIISemester	XX109	3	C	5	15
IYearIISemester	XX110	5	B	6	30
IYearIISemester	XX111	4	A+	9	36
IYearIISemester	XX112	2	F	0	00
IYearIISemester	Xx113	2	A	8	16
IYearIISemester					
Total		25(23*)			164
SGPA=164/25=6.56CGPA= 296/51=5.80					

*TotalNo.ofcreditsexcludingthosewith'F';thisisparticularlyimportanttokeeptrackofthenumberofcredits earnedbya studentuptoanysemester.

The above illustrated calculation process of CGPA will be followed for each subsequent semesteruntil 8th semester. The CGPA obtained at the end of 8th semester will become the final CGPAsecuredforentire B.Tech.Programme.

11.12 Formeritrankingorcomparisonpurposesoranyotherlisting,onlythe‘roundedoff’valuesofthe CGPAwillbeused.

11.13 Forcalculationslistedinregulations11.7to11.10,performanceinfailedsubjects/courses (securing F grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. After passing thefailed subject(s) newly secured letter grades will be taken into account for calculation ofSGPAand CGPA.However,mandatorycourseswillnotbetakeninto consideration.

SGPA and CGPA of a semester will be mentioned in the semester Memorandum of Grades if allsubjects of that semester are passed in first attempt. Otherwise, the SGPA and CGPA shall bementioned only on the Memorandum of Grades in which sitting he passed his last exam in thatsemester.

12 EARNINGOFCREDITS

A student shall be considered to have completed a Course successfully and earned thecreditsifhe/shesecuresanacceptablelettergradeintherange‘O’to‘P’.Lettergrade'F'in anyCourseimpliesfailureofthe studentinthat Course and nocreditsearned.

13 PASSINGSTANDARDS

13.1 Astudentshallbedeclaredsuccessfulor‘passed’inasemester,ifhesecuresaGP≥5(‘C’ gradeorabove)ineverysubject/courseinthatsemester(i.e.whenthestudentgetsanSGPA ≥ 5.0 at the end of that particular semester); and he shall be declared successful or ‘passed’ intheentireundergraduateprogramme,onlywhengetsaCGPA≥5.00(‘C’gradeorabove)fortheaw ardofthedegreeasrequired.

13.2 Afterthecompletionofeachsemester,agradecardorgradesheetshallbeissuedtoalltheregistered students of that semester, indicating the letter grades and credits earned. It willshow the details of the courses registered (course code, title, no. of credits, grade earned, etc.)and creditsearned.ThereisNOexemptionofcreditsinanycase.

13.3 A Student shall be declared successful or ‘passed’ in any Non-Credit Subject/ Course, ifhesecures aminimumofPgrade.

13.4 After thecompletionofeach Semester,aGradeCard orGradeSheet(orTranscript)shall

be issued to all the registered students of that semester, indicating the Letter Grades andCreditsearned.Itwillshowthedetailsofthecoursesregistered(CourseCode,Title,No.ofCredits,Grade Earnedetc.),Credits earned,SGPA,andCGPA.

14 DECLARATION OFRESULTS

14.1 ComputationofSGPAand CGPAaredone usingtheprocedure listedin11.7 TO11.10.

14.2 For final percentage of marks equivalent to the computed final CGPA, the followingformulamaybeused.

$$\%ofMarks = (finalCGPA - 0.5) \times 10$$

15 AWARDOFDEGREE

15.1 A student who registers for all the specified subjects/ courses as listed in the coursestructure and secures the required number of 160 credits (with CGPA $\geq$ 5.0), within 8academicyearsfrom the date of commencementof the firstacademicyear,shall bedeclared to have 'qualified' for the award of B.Tech. degree in the branch of Engineeringselectedatthetimeofadmission.

15.2 A student who qualifies for the award of the degree as listed in item 15.1 shall be placedinthefollowingclasses

15.3 A student with final CGPA (at the end of the undergraduate programme) > 8.00, andfulfillingthefollowingconditions-shallbeplacedin'FirstClasswithDistinction'.

However,he/she

(i) Should have passed all the subjects/courses in 'First Appearance' within the first 4academic years (or 8 sequential semesters) from the date of commencement of first yearfirstsemester.

(ii) Shouldnothavebeendetainedorpreventedfromwritingthesemesterendexaminationsinanysemesterduetoshortageofattendanceoranyotherreason.

A student not fulfilling any of the above conditions with final CGPA > 8 shall be placedin'FirstClass'.

15.4 Students with final CGPA (at the end of the undergraduate programme) ≥ 7.0 but <8.00shallbeplacedin'FirstClass'.

15.5 Students with final CGPA (at the end of the undergraduate programme)≥ 6.00 but<7.00,shallbeplacedin'SecondClass'.

15.6 All other students who qualify for the award of the degree (as per item 15.1), with finalCGPA (at the end of the undergraduate programme)≥ 5.00 but < 6, shall be placedin'passclass'.

15.7 A student with final CGPA (at the end of the undergraduate programme) < 5.00 will notbe eligiblefortheawardofthedegree.

16 CONSOLIDATEDGRADE CARD

A consolidated grade card containing credits & grades obtained by the candidates will beissuedaftercompletionofthefouryears B.TechProgram.

17 WITHHOLDINGOF RESULTS

If the student has not paid the fees to the College at any stage, or has dues pending due toany reason whatsoever, or if any case of indiscipline is pending, the result of the studentmay be withheld, and the student will not be allowed to go into the next higher semester.The award or issue of the degree may also be withheld in such cases and the matter will bereferredtoCollegeAcademic Committeeforfinaldecision.

18 TRANSITORYREGULATIONS

18.1 Discontinued, detained for attendance, detained for want of credits, or failed students areeligible for readmission as and when the course is offered during the subsequent academicyearas perthecollegeadmissionprocedures.

18.2 Students on transferfrom anon-autonomousorfrom anautonomouscollegeshallcompleteallthecoursesoftheconcernedprogrammenotcoveredint heearlierorganization. However, he/she should take the remaining courses in the programme alongwiththeotherstudents.

18.3 Thereshallbenobranchtransfersafterthecut-offdateofadmissions madeintheB.Tech.Iyear.

19 TRANSCRIPTS

After successful completion of the total programme of study, a Transcriptcontainingperformance of all academic years will be issued as a final record. Duplicate transcriptswillalsobeissuedifrequiredafterthe paymentofrequisitefee.

20 SUPPLEMENTARYEXAMINATIONS

InadditiontotheRegularendsemesterexaminations,SupplementaryExaminationsforthe previoussemesters willbe conductedalongwithEndSemesterExaminations.Astudent can appear for any number of supplementary examinations till he/she clears allcourseswhichhe/shecouldnotclearinthefirstattempt.However,themaximumstipulatedperiodcannotberelaxedunderanycircumstances.

21 GRADUATIONCEREMONY

21.1 The College shall have its own annual Graduation Ceremony for the award of degrees tostudents completing the prescribed academic requirements in each case, in consultationwiththe Universityandbyfollowingtheprovisionsinthe Statute.

21.2 The College shall institute Prizes and Awards to meritorious students, for being givenawayannuallyattheGraduationCeremony.

22 **TERMINATION**OFTHEPROGRAM

Theadmissionofastudenttotheprogrammaybeterminatedandthestudentmaybeaskedtoleave the Institute inthefollowingcircumstances:

- IfthestudentfailstosatisfytheAcademicrequirementsoftheprogramwithinthemaximum periodstipulatedforthatprogram.
- Ifthestudentfailstosatisfythenormsofdisciplinespecifiedbytheinstitutefromtime totime.

23 NON-CREDITCOURSES(MandatoryCourses)

23.1 Requirementof75%attendanceasperthecollegeregulationsiscompulsoryofcompletingtheMandatorycourses.

23.2 SpecifiednumberofMandatoryCoursesamongthedesignatedonesiscompulsoryrequirementforallthe studentsfortheawardofB.Tech.Degree.

23.3 Althoughthesecoursesdonotcarryanycredits,performanceinthesesubjectsisevaluatedfollowingtheprocedureadoptedforothersubjectswiththesamemarks.However,theirperformancewillbeindicatedinthestudent'smemoofmarksasSatisfactory/Unsatisfactory.

MALPRACTICESRULES

DISCIPLINARYACTIONFOR/IMPROPERCONDUCTINEXAMINATIONS

	NatureofMalpractices/Improperconduct	**Punishment**
	Ifthestudent:	
1.(a)	Possesses or keeps accessible in examination hall, anypaper,notebook,programmablecalculators,cellphones, pager, palm computers or any other form ofmaterial concerned with or related to the subject of theexamination(theory orpractical) inwhichstudent isappearingbuthasnotmadeuseof(materialshallincludeanymarks onthebodyofthestudentwhichcan beused as an aidin thesubjectof theexamination)	Expulsionfromtheexaminationhallandcancellationoftheperformanceinthatsubjectonly.
(b)	Gives assistance or guidance or receives it from anyotherstudentorallyorbyanyotherbodylanguagemethods or communicates through cell phones with anystudentorpersonsinoroutsidetheexamhallin respect ofanymatter.	Expulsionfrom the examination hall and cancellationofthe performance in that subject Only of all the studentsinvolved. In case of an outsider, he will be handed over tothepolice andacaseisregisteredagainsthim.
2.	Has copiedinthe examination hall from any paper,book,programmablecalculators,palmcomputersor any other form of material relevant to the subject of theexamination(theoryorpractical)inwhichthestudent isAppearing.	Expulsion from the examination hall and cancellation of theperformanceinthatsubjectonly.
3.	ImpersonatesanyotherstudentinConnectionwiththeexamination.	The student who has impersonated shall be Expelled fromexamination hall. The student is also debarred and forfeitstheseat.Theperformanceoftheoriginalstudentwhohas beenimpersonated,shallbecancelledinallthesubjectsof

		theexamination(includingpractical'sandprojectwork)already appearedandshallnotbeallowedtoappearforexaminationsofthe remainingsubjectsofthatSemester/year.Thestudentisalsodeba rredfortwoconsecutivesemestersfromclassworkandAllExami nations.Thecontinuationofthecoursebythestudentissubjecttot heacademicregulationsinconnectionwithForfeitureofseat.Ifth eimposterisanoutsider,hewillbehandedovertothe police andacaseisregisteredagainsthim.
4.	Smuggles inthe answerbookoradditionalsheetortakes outorarranges To send outthequestionpaperduringtheexamination or answer book or additional sheet, duringoraftertheExamination .	Expulsionfromtheexaminationhallandcancellationofperforma nce in that subject and all the othersubjects thestudenthasalreadyappearedincludingpracticalexaminations and project work and shall not be permitted forthe remaining examinations of the subjects of that Semester/year.Thestudentisalsodebarredfortwoconsecutivese mesters fromclassworkand All Examinations. The continuation of the course by thestudentissubjecttotheacademic Regulationsin connection with Forfeitureofseat.
5.	Uses objectionable, abusive or offensive languageinthe answer paper or in letters to the examiners or writestotheexaminerrequestinghimtoawardpassMarks.	Cancellationoftheperformanceinthatsubject.
6.	Refusestoobeytheordersofthechiefsuperintendent/assis tant superintendent / any officeron duty or misbehaves or creates disturbance of anykindinandaroundtheexaminationhallororganizesaw alkoutorinstigatesotherstowalkout,orthreatens the officer-in charge or any person on dutyin or outside the examination hall of any injury to hisperson or to any of his relations whether by words,eitherspokenorwrittenorbysignsorbvisiblerepre sentation, assaults the officer-in- charge, or anyperson on duty in or outside the examination hall orany of his relations, or indulges in any other act ofmisconduct or mischief which result in damage to ordestruction of property in the examination hall or anypart of the college campus or engages in any other actwhich intheopinionoftheofficerondutyamountsto useofunfairmeansormisconductorhasthe	1. In case of students of the college, they shall be expelledfromexaminationhallsandcancellationoftheirperfo rmanceinthatsubjectandallothersubjectsthestudent(s) has (have) already appeared and shall not bepermitted to appear for the remaining examinations of thesubjects ofthatSemester/year. 2. The students also are debarred and forfeit their seats. Incase of outsiders, they will be handed over to the policeandaPolicecaseisregisteredagainstthem.

	tendencytodisrupttheorderlyconductoftheexamination.	
7.	Leaves the exam hall taking away answer script orintentionally tears off the script or any part there ofinsideoroutsidetheexaminationhall.	1. Expulsion from the examination hall and cancellation ofperformance in that subject and all the other subjects thestudenthasalreadyappearedincludingpracticalexaminations and project work and shall not be permittedfortheremainingexaminationsofthesubjectsofthatSemester/year. 2. The student is also debarred for two consecutive semestersfromclassworkandAllUniversityexaminations.Thecontinuationofthecoursebythestudentissubjecttothe academicregulationsinconnection withForfeitureofseat.
8.	Possesses any lethal weapon or firearm intheexaminationhall.	1. Expulsion from the examination hall and cancellation ofthe performance in that subject and all other subjects thestudenthasalreadyappearedincludingpracticalexaminationsandprojectworkandshallnotbepermitted for the remaining examinations of the subjectsofthatSemester/year. 2. Thestudentisalsodebarredandforfeits theseat.Police casewill beregistered.
9.	Ifstudentofthecollege,whoisnotastudentfortheparticularexaminationoranypersonnotconnectedwiththecollegeindulgesinanymalpracticeorimproperconductmentionedinclause6to8.	Expulsion from the examination hall and cancellation of theperformance in that subject and all other subjects the studenthas already appeared including practical examinations andproject work and shall not be permitted for the remainingexaminationsof thesubjectsof thatSemester/year.Thestudentisalsodebarredand forfeitstheseat. Person(s) who do not belong to the college will be handedovertothepoliceand,apolicecaseWillberegisteredagainstthem.
10.	Comesinadrunkencondition totheexaminationhall.	Expulsion from the examination hall and cancellation of theperformance in that subject and all other subjects the studenthasalready appearedforincludingpracticalexaminationsandprojectworkandshallnotbepermittedfortheremaining examinationsofthesubjectsofThatsemester/year.
11.	Copyingdetectedonthebasisofinternalevidence,suchas, duringValuationorduringspecialscrutiny.	Cancellation of the performance in that subject and all othersubjectsthestudenthasappearedforincludingpracticalexaminationsandprojectworkofthatsemester/year

		Examinations.
12.	If any malpractice is detected which is not covered inthe above clauses 1 to 11shallbe reported to thePrincipalforfurtheractiontoawardasuitable Punishment.	

Malpractices identified by squad or special invigilators: Punishment to the students as per theabove guidelines.

24 General

24.1 Whereverthewords“he”, “him”,“his”,occurin theregulations,they include“she”,“her”,“hers”.

24.2 Wherethewords “Subject” or“Subjects”,occurinthese regulations,they alsoimply“Course”or“Courses”.

24.3 Theacademicregulationshould bereadasawholeforthepurposeofinterpretation.

24.4 Incaseofanydoubtorambiguityintheinterpretationoftheaboverules,thedecisionofthe AcademicCouncil isfinal.

24.5 The Institution may change or amend the Academic Regulations, course structure orsyllabi atany time,andthe changes oramendmentsmade shallbe applicable toallstudentswitheffectfromthedatenotifiedbytheInstitution.

ACADEMICREGULATIONSFORB.TECHLATERALENTRYSTUDENTS

Applicablefor thestudentsadmittedintoII-year B. Tech.(LateralEntryScheme)fromtheAcademic Year2023-24.

1.EligibilityforawardofB. Tech.Degree(LES)

The LES candidates shall pursue a course of study for not less than three academic years andnotmorethansix academicyears.

The candidate shall register for 120 credits and secure 120 credits by securing a minimumCGPAof≥5ofB.Tech.IItoIVyearforthe awardofB.Tech.Degree.

Thestudent(s),whofailtofulfilltherequirementfortheawardofthedegreeinsixAcademic years from the year of admission, shall forfeit their seat(s). The attendance regulationsofB.Tech.(Regular)shallbeapplicabletoB.Tech.(LES).

2.PromotionRule

A student shall be promoted from B.Tech., II Year to III Year if he/she gets at least a minimum of 24out of 40credits,up toII-yearII semester, from all the examinations,whetheror notthecandidate takestheexaminations.

A studentshall be promoted from IIIyear to IV yearif he/she gets a minimum of 48out of 80credits, up to III-year II semester, from all the examinations, whether or not the candidate takesthe examinations.

A student shall register and put-up minimum attendance in all 120 credits and earns all 120 credits tobeeligiblefortheawardofB.Tec degree.

A student, who fails toearn 120 credits as indicatedin the course structure within six academicyears,shallforfeithis/heradmissioninB.Tech.Course.

3.AwardofClass

Astudent,whosatisfiesalltherequirementsprescribedforthecompletionoftheB.Tech.program,iseligiblefo rthe awardofthe saiddegree,inanyone ofthe followingfourclasses:

CGPA	ClassAwarded	
≥8.00	FirstClasswithDistinction	From the CGPAsecuredfrom120credits
≥7.00 -<8.00	FirstClass	
≥6.00 -<7.00	SecondClass	
≥5.00 -<6.00	PassClass	

4. AlltheotherregulationsasapplicabletoB.Tech.4-yeardegreecourse(Regular)willholdgoodforB.Tech.(LateralEntryScheme).

Annexure-I

B.TechwithMinorProgram

VJIThas always been emphasizing to orient the students towards the technologies thatshall drive the world in the years to come; the Institution has introduced the Bachelor **ofTechnology in a particular specialization with minor program** *(For eg., B. Tech. inElectronics&CommunicationEngineeringwith Minorin AI&ML)*fromAY.2021-22.

The Bachelor of Technology (B.Tech) with minor programs offered by VJIT focuses on thefundamentalprincipleofEngineering,wherethedevelopmentofcritical&analyticalthinking and the ability to develop a distinctive approach to any given problem statementshallbethe drivingfactorthatfuelsthepedagogicdiscourse.

B.Tech.withMinordegree:

A studentwillbeeligibletogetB.Tech.with MinorDegree,ifhe/shecompletesanadditional18credits.Theseshouldbeacquiredthroughregistered coursesaspertherespective courses offered by the Institute or through MOOCs as equivalent to the coursesofferedbytheInstitute.

ThekeyfeaturesoftheB.TechwithMinorprogrambeing:

- The student can identify **only one area** of specialization along with his/her basicengineeringdegree.
- The no. of courses for Minor program is limited to 2 in a semester along with normalcourses.
- InadditiontothetraditionalB.Tech.programwhichisa4-Year(8Semesterprogram)offering160coursecredits,additional **18Credits**(minimum) tobecompleted as part of the **B.Tech with Minor program** betweenthe**5th**and**8th**semesterwithinthesameperiodof4-YearB.Tech.program.
- To successfully complete the **B.Tech with Minor program** the student shall need toclear the examinations for the additional 18 Credits. These credits can be acquiredadoptingadvancedsubjectsintheofferedspecialization/interdisciplinarystudies, etc.

The followingaretherecommendedareasforMinorprograms:

S.No.	MinorProgram	Eligiblebranchofstudents	@ OfferingDepartment	AwardofDegree
1	Construction Engineering& Management	Allbranches,exceptB.Tech.CivilEngg.	CivilEngg.	"B. Tech. in branch namewithMinorin planning & Construction
2	Robotics	Allbranches,exceptB.Tech.Mech.Engg	Mech.Engg.	"B. Tech. in branchname withMinorinRobotics
3	ElectricVehicles	Allbranches,exceptB.Tech.EEE	EEE	"B. Tech. in branchname withMinorinElectricVehicles
4	SustainableEnergy	Allbranches,exceptB.Tech.EEE	EEE	"B. Tech. in branch namewithMinorinSustainable Energy
5	IoT	Allbranches,exceptB.Tech. ECE	ECE	"B. Tech. in branchname withMinorinIOT"
6	CSE	All branches, except B.Tech.CSE	CSE	"B.Tech.inbranchnamewithMinorinCSE
7	IT	Allbranches,exceptB.Tech.IT	IT	"B. Tech. in branchname withMinorinIT
8	AI&ML	Allbranches,exceptB.Tech.AI	AI	"B. Tech. in branchname withMinorinAI&ML
9	Business &InnovationManagement (B&IM)	All branches ofB.Tech.	MBA	"B.Tech.inbranchnamewithMinorinB&IM

Rules&RegulationsforB.Tech.withMinorDegree

1. The duration and all the academic regulations are on par with regular 4-Years B. Tech.program.A studentcompletes/earnsall therequiredcredits of acourse,ifhe/sheregistersforthe courseandobtains a passinggrade.
2. Only Students having earned all the credits at the end of the third semester (i.e., end of2nd Year I-semester) without active backlogs are eligible to register for Minor program, inthe fifthsemesteronly.
3. For B. Tech with Minor,a student needs to earn additional minimum 18 credits (overand above the required 160 credits for B. Tech degree) as per the Minor program coursestructure.
4. Course registration fee per course should be met by the students only. The registrationfeepercreditis Rs.1000/-.
5. After registering for the Minor programme, if a student fails in any registered course andunable to earn all the required 18 credits in a specified duration (twice the duration of thecourse), he/she shall not be awarded Minor degree. However, if the student earns all therequiredcreditsof160forB.Tech.,he/shewillbeawardedonlyB.Techdegreeinthe

concerneddiscipline.Thereisnotransferof creditsfrom Minorprogram coursestoregularB.Tech.degreecourse&viceversa.

6. These18credits(minimum)aretobeearnedfrom:
   - AdditionalCoursesofferedinthespecializationbytheconcerneddepartment.
   - MOOC courses offered by SWAYAM MOOCs as notified/approved by the university(minimum3credits each)fromtimetotime.
   - Anyexpensesincurred fortheMOOCscourseto bemetbythestudentsonly.
7. Online courses registered shall be certified ones with grading/marks/pass. Only Pass-grade/pass-marks/passorabovegrade/marksshallbeconsideredforinclusionofgrades.
8. If the MOOC course is a pass course without any grades, the grade to be assigned as perthe mainregulations.
9. Prior to registration to MOOC courses, formal approval of the courses, by the Universitybased on the organization of the programme, syllabus coverage, detailed duration of theprogramme,natureofevaluationetc.isneeded.
10. Theadditionalcourses(forminimumof 18credits)maybefrom thedepartmentsoffering courses/subjects for the Minor degree. These subjects can be considered asadvancedcoursesinthatspecialization/interdisciplinarycoursesetc.
11. However, the choice to opt/ take the Minor program is purely on the choice of thestudents in a particular engineering stream. Only top 50% of the total class in eachspecialization, based on their overall percentage of marks without active backlogs up to3rdsemester (II-year I Semester), are eligible to register for Minor program courses/subjects.

Requirement fortheAward ofB.Tech withMinorDegree:

a) A student may opt for B.Tech with Minor degree if she/he has no active backlogs till3rdsemester.
b) For B. Tech with Minor, a student needs to earn additional 18 credits (minimum overand above the required 160 credits for B. Tech degree) as per his/her registered Minorprogram.
c) Student should take permission of registration for the B.Tech with Minor programfrom Head of the department & faculty/course in-charge before commencement of 3rdYearISemesteror5thSemester.
d) To successfully complete the B.Tech with Minor program the student shall need toclear theexaminationsfortheadditional 18Credits.Theexaminationsshallbeconductedas pertheAICTEas wellas Universityguidelines.
e) The student shall be given a choice of withdrawing all the courses registered and/orcredits earned for Minor courses/degree; and in that case the student will be awardedonly B. Tech. degreein the concernedspecialization on earning the required creditsof160inaspecifiedduration.

Thefollowingarethecoursestructure ofB.TechMinorprogramsofferedbyvariousdepartments:

CourseStructureofB.Tech MinorProgramsofferedbyVariousDepartments

Department ofCivilEngineering

B.TECH MINOR IN PLANNING & CONSTRUCTION

S.No.	Year/Semester	Course	L	T	P	Credits
1	III-I	PrinciplesofSurveying/ **MOOCS**	3	0	0	3
2	III-I	SurveyingLab	0	0	3	1.5
3	III-II	Fundamentals of Building Planning	3	0	0	3
4	III-II	Computer aided Building planning Lab	0	0	3	1.5
5	IV-I	Civil Engineering Materials	3	0	0	3
6	IV-I	Sustainable construction Practices	3	0	0	3
7	IV-II	Construction Management/ MOOCS	0	0	6	3
TotalCredits						**18**

DepartmentofMechanicalEngineeringB

.TECHMINOR IN ROBOTICS

S.No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	PrinciplesofRobotics	3	0	0	3
2		SCILabforRoboticsLab	0	0	3	1.5
3	III-II	Microcontrollersfor Robotics	3	0	0	3
4	IV-I	Advanced Robotics(or) SWAYAMcourseon IntroductiontoRobotics	4	0	0	4
5		RoboticSimulationLab	0	0	3	1.5
6	IV-II	Implementation ofRoboticSystems	3	0	0	3
7		MiniProject	0	0	4	2
TotalCredits						**18**

DepartmentofElectrical&ElectronicsEngineeringB.TECHMI

NOR INSUSTAINABLEENERGY

S.No.	Year/ Semester	CourseTitle	L	T	P	Credits
1.	III-I	EnergyanditsResources	4	0	0	4
2.	III-II	ClimateChangeUnderstandingand Observations	3	0	0	3
3.	III-II	EnergyanditsResourcesLab	0	0	3	1.5
4.	IV-I	EnergyStorageforRenewable	3	0	0	3
5.	IV-II	**Electives** 1. ElectronicsforRenewable 2. SolarEnergyTechnologiesandSystemDesign 3. SolarEnergySystem InstallationsandMaintenance	3	0	0	3
6.	IV-II	EnergySystems Lab	0	0	3	1.5
7.	IV-II	Internship/MiniProject	0	0	4	2
TotalCredits						**18**

B.TECHMINORINELECTRICVEHICLES

S.No.	Year/Semester	CourseTitle	L	T	P	Credits
1.	III-I	ElectricVehicleandEnergySystems	4	0	0	4
2.	III-II	PowerElectronicsandControlof ElectricMachines	3	0	0	3
3.	III-II	SimulationLab	0	0	3	1.5
4.	IV-I	AutomotiveTransmissionand Communication	3	0	0	3
5.	IV-II	**Electives** 1. ElectricVehicleDynamicsandTesting 2. BatteryChargingTechnologyforEVs 3. Electric Vehicle: Safety andRegulationsandFutureofEVs	3	0	0	3
6.	IV-II	ElectricMobilityLab	0	0	3	1.5
7.	IV-II	Internship/MiniProject	0	0	4	2
TotalCredits						**18**

DepartmentofElectronics&CommunicationengineeringB.T

ECHMINOR ININTERNETOFTHINGS

S.No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	Embedded Sensors and IOTArchitectures	4	0	0	4
2	III-I	EssentialsofPythonProgrammingLaboratory	0	0	3	1.5
3	III-II	IOTCommunicationProtocols	3	0	0	3
4	III-II	SmartTechnologies	3	0	0	3
5	IV-I	Fog&EdgeComputingfor IoT	3	0	0	3
6	IV-I	IoTAutomationwithRaspberry-PILaboratory	0	0	3	1.5
7	IV-II	MiniProject	0	0	4	2
TotalCredits						**18**

DepartmentofComputerScienceandEngineeringB.TECHMI

NORINCOMPUTERSCIENCEANDENGINEERING

S. No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	Computer SystemArchitecture	3	0	0	3
2	III-I	Data Structures	3	0	0	3
3	III-I	DataStructuresLab	0	0	3	1.5
4	III-II	DataWarehousingandData Mining	3	0	0	3
5	III-II	DataWarehousingandData MiningLab	0	0	3	1.5
6	IV-I	ArtificialIntelligence LinuxProgramming SoftwareTestingMethodologies E-Commerce	3	0	0	3
7	IV-II	MiniProject	0	0	6	3
TotalCredits						**18**

DepartmentofInformationTechnologyB.TECHMI

NORININFORMATIONTECHNOLOGY

S. No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	FundamentalsofAlgorithms	3	0	0	3
2	III-I	AlgorithmsLab	0	0	3	1.5
3	III-II	FoundationsofCloudComputing	3	0	0	3
4	IV-I	FundamentalsofDatabaseManagementSystems	3	0	0	3
5	IV-I	FundamentalsofDatabaseManagementSystemsLab	0	0	3	1.5
6	IV-II	PrinciplesofArtificialIntelligenceBigData Analytics Internet of ThingsBlockchainTechnologies(or) SwayamCourseonBigDataComputing	3	0	0	3
7	IV-II	MiniProject				3
TotalCredits						**18**

DepartmentofArtificialIntelligence

B.TECHMINORINARTIFICIALINTELLIGENCE&MACHINELEARNING

S.No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	FoundationsofArtificialIntelligence	3	0	0	3
2	III-I	PythonProgrammingLab	0	1	3	2.5
3	III-II	FoundationsofMachineLearning	3	0	0	3
4	III-II	FoundationsofMachineLearning Lab	0	0	3	1.5
5	IV-I	BasicsofDeep Learning	2	0	0	2
6	IV-I	BasicsofDeepLearningLab	0	0	2	1
7	IV-II	**Electives:** 1. PrinciplesofNaturalLanguageProcessing 2. IntroductiontoComputer Vision 3. SoftComputing 4. Introduction to Artificial NeuralNetworks	3	0	0	3
8	IV-II	MiniProject	0	0	0	2
TotalCredits						**18**

DepartmentofManagementStudies

B.TECHMINORINBUSINESS&INNOVATIONMANAGEMENT

S. No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III -I	FoundationsofManagement	4	0	0	4
2	III-II	Innovation &DesignThinking	3	0	0	3
3	III-II	DesignthinkingandIdeationLaboratory	0	0	3	1.5
4	IV-I	BusinessIdeationBusinessModels	3	0	0	3
5	IV-I	BusinessPlanDevelopment	0	0	3	1.5
6	IV-II	**AnyONE ofthefollowingsubjects:** 1. Projectmanagement 2. MarketResearch 3. LegalAspectsofBusiness 4. TechnologyManagement (if not studied in theregularcourse)	3	0	0	3
7	IV-II	**MiniProject** FieldStudyReport/Feasibility reportonNewventures/Pitfallsofentrepreneurship	0	0	4	2
TotalCredits						**18**

Annexure-II

B.Tech(Honors)

The B. Tech. (Honors) programs are proposed to choose for an area of specialization amongvarious emerging technologies in order tobe a domain expert.A studentwill be eligible toget B. Tech. (Honors) Degree, if he/she completes an additional 20 credits. These should beacquired through registered courses as per the respective courses offered by the University orthroughSWAYAMMOOCs asequivalenttothecoursesofferedbythe Institute.

1. Objectives

Thekeyobjectivesofoffering**B.Tech.(Honors)**programsare:

- To expand thedomainknowledgeoftheundergraduatestudents.
- Toincreaseeducationalandprofessionalskills requiredforpursuinghigherstudies orresearchintheareaofinterest.
- Toacquiremoreknowledgeasperindustryrequirementforbetteremployment.

Thekeyfeaturesofthe**B.Tech.(Honors)**programbeing:

- Thestudentcanidentify**onlyonearea**ofspecializationalongwithhis/herbasicengineeringdegree.
- Theno.ofcoursesregisteredforhonorsislimitedtoTWOinasemesteralongwithnormal courses.
- In contrast toa traditional B. Tech. program which is a 4 Year (8 Semesterprogram) offering 160 course credits, the **B. Tech. (Honors)** program is a 4 Yearprogram(8Semesterprogram)offering180course credits.
- The additional **20 Credits (**Minimum, and maximum 20 credits**)** to be completedaspartofthe **B.Tech.(Honors)** programis to be spaced out betweenthe**5th**and**8th semester.**
- To successfully complete the **B. Tech. (Honors)** program thestudentshall needto clear the examinationsfor the additional 20Credits.These credits can beacquiredoptingadvancedsubjectsintheofferedspecialization/research/interdisciplinarystudies,etc.

2. ProposedSpecializationDetails

As per AICTE guide lines 2021-22, some of the VJIT proposed B. Tech. (Honors) programsare givenbelowineachmajordiscipline:

S.No.	HonorsProgram	Eligiblebranchofstudents	@ OfferingDepartment	AwardofDegree
1.	StructuralEngineering	B.Tech.CivilEngg.	CivilEngg.	"B.Tech.(Honors)inbranchnamewithSpecialization in StructuralEngineering
2.	CAD/CAM	B.Tech.Mech.Engg.	Mech.Engg.	"B.Tech.(Honors)inbranch namewithSpecialization inCAD/CAM
3.	PowerSystems	B. Tech.EEE	EEE	"B.Tech.inbranchnamewith Minor in PowerSystems
4.	ECE	B.Tech.ECE	ECE	"B. Tech. (Honors) inbranch namewithSpecializationinECE
5.	CSE	B. Tech.CSE	CSE	"B.Tech.(Honors)inbranch namewithSpecializationinCSE

3. RulesandRegulationsforB.Tech.(Honors) Degree

1. The duration and all the academic regulations are on par with regular 4-Years B. Tech.program. A student will be awarded B. Tech. (Honors) degree, if he/she completes &earns all the required credits of a course for the registered courses and obtains a passinggrade.
2. The departmentconcerned shall have atleast one M.Tech (Preferably NBA accredited)inthe concernedstream,forB.Tech.(Honors)registration.
3. Only Students having earned all the credits with CGPA of **7or above** at the end of thethird semester (i.e., end of 2nd Year I Sem.) are eligible to register for B.Tech. (Honors),inthefifthsemesteronly.
4. For B. Tech. (Honors), a student needs to earn additional minimum 20 credits (over andabove the required 160 credits forB. Tech degree)relevant to her/his discipline as perthe coursestructure.
5. Course registration fees per course should be met by the students only.Theregistrationfeespercreditis Rs.1000/-.

6. After registering for the B.Tech. (Honors) programme, if a student fails in any registeredcourse and unable to earn all the required 20 credits in a specified duration, he/she willnotbe eligibleforobtainingB.Tech.(Honors)degree.
7. There is NO reduction in total no. of credits offered in the concerned regulations and NOcredittransferfromnormalcourses tohonorscoursesandvice versa.
8. These20creditsaretobeearnedfrom:
   - Additional Courses offered in the same specialization by the concerned department.Course registration fee per course should be met by the students only as per the normsoftheUniversity.
   - CoursesofferedbyNPTEL/SWAYAMMOOCsasnotified/approvedbytheuniversity (minimum 3 credits each) from time to time. The duration of courses shallbeaminimumof12-14weeks.TheassessmentandcertificationoftheNPTEL/SWAYAM MOOCs courses shall be asper the prescribed norms of theNPTELandapprovedbytheInstitute
   - Any expenses incurred for the NPTEL/SWAYAM MOOCs course should be met bythe studentsonly.
9. Online courses registered shall be certified ones with grading or marks or pass/ fail. OnlyPass- grade/ pass-marks/ pass or above grade/marks shall be considered for inclusion ofgrades.
10. If the MOOC course is a pass course without any grades, the grade to be assigned as perthe mainregulations.
11. The additional courses (for minimum of 20 credits) may be from the same department asthe undergraduate major. These subjects can be considered as advanced courses in thatspecialization/research/interdisciplinarycoursesetc.
12. However, the choice to opt/take the Honors program is purely on the choice of thestudents in a particular engineering stream. Only top 30% of the total class in eachspecialization, based on their overall percentage of marks in first attempt (without fail inany subject) up to 3rd semester (II-year I Semester), and are eligible to register for honorsprogramcourses/subjects.

RequirementfortheAwardofB. Tech.(Honors)Degree:

A student enrolled in a B. Tech. program may also graduate with Honors, provided thestudent completes all the additional requirements for Honors, as specified by the regulationsfor the program in which he/she is enrolled. These additional requirements normally shouldinclude:

a) For B. Tech (Honors), a student needs to earn additional 20 credits (minimum, overand above the required 160 credits for B. Tech degree) relevant to the discipline asrecommended by the faculty advisor based on the courses offered in course structureforhonors degree.
b) Studentshouldnothavereceivedany 'F'grade throughout theprogram infirstattempt(withoutfailinanysubject).
c) Transfer of credits will not bepermitted from regular courses to honors courses andviceversa.

4.Registration

1) At the beginning, just before the start of classes, of each semester, a student shallregisterfor the courses he/she wishes to take in thatsemester. A studentshallnormallybeallowedtoregisterforacourseonlyifhe/shehaspassedallthenecessarypre-requisitesforthatcourse.
2) Student should take permission of registration for the B.Tech with Honors programfromHeadofthedepartment&faculty/coursein-chargebeforecommencementof3rdYearISemesteror5th Semester.
3) Registrationiscompulsoryforall students,andisthesoleresponsibility of thestudent and must be completed before the last date of registration with necessarycourse registrationfeepersubject.
4) Nostudentisallowedtoregisterdirectlyandtheregistrationshallbethroughinstitute/ department. The registered students list shall be submitted to the universitybytheconcernedprincipal.
5) The institute/ department shall maintain the record of student registered and pursingthe Honors degree.
6) Theinstitute/departmentshallpreparethetimetablefortheregistered Honorscourseswithoutanyoverlap/clashonothercoursesthestudentregisteredfor.
7) Minimum class strength (i.e., 33% of intake) is required for offering in-class Honorscourse.

Thefollowingarethecoursestructure of B.Tech Honorsprogramsofferedbyvariousdepartments:

CourseStructureofB.TechHonorsProgramsofferedbyVariousDepartments

Department ofCivilEngineering

B.TECH HONORS IN STRUCTURAL ENGINEERING

S.No	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	AdvancedR.C.Design	3	0	0	3
2	III-I	AdvancedConcreteLab	0	0	3	1.5
3	III-II	StructuralDynamics	3	0	0	3
4	III-II	Computeraidedstructuraldesign Lab	0	0	3	1.5
5	IV-I	ResearchMethodology	3	0	0	3
6	IV-I	TechnicalPaperWriting	2	0	0	2
7	IV-II	Cost managementofEngineering projects/onecourse fromMOOCS	3	0	0	3
8	IV-II	Earthquake ResistantDesignOfBuildings/ onecoursefromMOOCS	3	0	0	3
TotalCredits						**20**

DepartmentofMechanicalEngineeringB

.TECH HONORSIN CAD/ CAM

S.No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	IndustrialRobotics	4	0	0	4
2	III-II	AdditiveManufacturing (or)SWAYA MCourseon Fundamentals of AdditiveManufacturingTechnologies	4	0	0	4
3		RoboticSimulation&3DPrintingLab	0	0	3	1.5
4	IV-I	AdvancedFiniteElementMethod	3	0	0	3
5		TechnicalPaperWriting	0	0	4	2
6	IV-II	AdvancedCAD	4	0	0	4
7		CAD/CAM/CAELab	0	0	3	1.5
TotalCredits						**20**

B.TECH HONORSIN POWERSYSTEMS

S.No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	HonorsElective -1	3	0	0	3
2	III-II	ResearchMethodologies	3	0	0	3
3	III-II	HonorsElective -2	3	0	0	3
4	IV-I	HonorsElective -3	3	0	0	3
5	IV-I	HonorsElective-4	3	0	0	3
6	IV-II	TechnicalPaperWriting	0	0	4	2
7	IV-II	HonorsElective-5	3	0	0	3
TotalCredits						**20**

HonorsElectives(E)	**Pre-Requisites**
HonorsElective -1	
WastetoEnergyConversion	PowerSystemsI
Energyanditsresources	PowerSystemsI
ElectricalSafetyand QualityManagement	PowerSystemsI
HonorsElective -2	
AdvancesinDistributionSystems	PowerSystemsI,PowerSystemsII
IoTApplicationsinElectricalEngineering	BasicElectricalEngineering
EnergyStoragesystems forrenewable	PowerSystemsI
HonorsElective-3	
SmartCities–ManagementofSmartUrban	PowerSystemsI,PowerSystemsII
Grid IntegrationofRenewableEnergy Systems	PowerSystemsI,PowerSystemsII
GridIntegrationofElectricVehicles	PowerSystemsI,PowerSystemsII
HonorsElective -4	
Cyber SecurityofSmartGrids	SmartGridsPlanningandOperation
SCADAandEnergyManagementSystems	PowerSystemsI andPowerSystemsII
DistributedGenerationandMicro Grids	PowerSystemsI andPowerSystemsII
HonorsElective -5	
SmartGridProtection	SmartGridsPlanningandOperation
ElectricalSafetyManagement	BasicElectricalEngineering
HVDCTransmission	PowerElectronics,PowerSystems

B.TECHHONORSINELECTRONICS&COMMUNICATIONENGINEERING

S. No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	**HonorsElective-1** 1.HighSpeed Electronics 2.Nanoelectronics	3	0	0	3
2	III-II	ResearchMethodologies &Ethics	3	0	0	3
3	III-II	**HonorsElective– 2** 1.WirelessSensorNetworks 2.Error Correcting Codes	3	0	0	3
4	IV-I	**HonorsElective– 3** 1.Mixed SignalProcessing 2.Adaptive SignalProcessing	3	0	0	3
5	IV-I	**HonorsElective– 4** 1.SpeechandAudioSignalProcessing 2.Scientificcomputing	3	0	0	3
6	IV-II	Introductionto IOT	3	0	0	3
7	IV-II	TechnicalPaperWriting	0	0	4	2
TotalCredits						**20**

Department ofComputerScienceandEngineering

B.TECHHONORSIN COMPUTERSCIENCEANDENGINEERING

S.No	Year /Semester	Coursetobechosenfrom/studied	L	T	P	C
1.	III-I	**HonorsElective-1** 1. PrinciplesofProgramming Languages 2. Software TestingMethodologies 3. ComputerGraphics	3	0	0	3
2.	III-II	**ResearchMethodologies**	3	0	0	3
3.	III-II	**Honors Elective-2** 1.Foundations of MachineLearning 2.Information Security3.SoftwareProjectManagement	3	0	0	3
4.	IV-I	**HonorsElective-3** 1.Big Data Analytics2.InternetofThings 3.RProgramming	3	0	0	3
5.	IV-I	**Honors Elective-4** 1.Advanced Databases2.NeuralNetworks andDeepLearning 3.NaturalLanguageProcessing	3	0	0	3
6.	IV-II	**TechnicalPaperwriting**	0	0	0	2
7.	IV-II	**HonorsElective-5** 1. Introduction to DataScience 2. ImageProcessing 3. BlockChainTechnologies or MOOCS	0	0	0	3
TotalCredits						**20**

DEPARTMENT CIVIL ENGINEERING

ACADEMIC REGULATIONS & SYLLABI (R-22)

B. Tech I Year to IV year Syllabus

Civil Engineering

w.e.f. the Academic Year 2022-2023

Vidya Jyothi Institute of Technology(An Autonomous Institution)

(Accredited by NAAC A+ Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)

Aziz Nagar Gate, C.B. Post, Hyderabad-500 075

ACADEMICREGULATIONS

(R-22)

For the

Bachelor of Technology

(B. Tech)

WitheffectfromtheAcademicyear2022-23

VIDYAJYOTHIINSTITUTEOFTECHNOLOGY

AziznagarGate,ChilkurBalajiRoad,H

yderabad,Telangana-500075

www.vjit.ac.in

Definitions ofKeyWords

Academic Year: An academic year is referred to as the period consisting of two consecutivesemesters,eachwith16 -18 weeks(90instructionaldays)followed bysemester examinations.

Course: A plan of study of a particular subject leading to an examination. All the courses neednot carry the same weightage. A course may be designed to comprise of lectures/ tutorials/laboratory work/fieldwork/outreachactivities/projectwork/viva/seminars/assignments/presentationsetc.oracombinationofsomeofthese.

Choice Based Credit System (CBCS): Choice Based Credit System (CBCS) is the programmein which the students have a choice tochoose from the prescribedcourses andthe entireassessmentisgradedbasedona creditsystem.

Letter Grade: It is an index of the performance of students in a said course. Grades are denotedbyletters O,A+,A,B+,B,CandF.

GradePoint: ItisanumericalweightallottedtoeachletterGradeona10-pointscale.

Credit: Aunitofmeasurementofcoursework.Itdeterminesthenumberofhoursofinstructions required per week. One creditis equivalent to one hour of teaching (lecture ortutorial)ortwohoursofpracticalwork/fieldworkperweek.

Credit Point: ItistheproductofGradePointandNumberofCreditsfor acourse.

Semester Grade Point Average (SGPA): SGPA stands for Semester Grade Point Average, ascore awarded to students based on how well they have fared in their course work at the end ofeach semester .It is the ratio of total creditpoints secured by a studentin the courses registeredin a semester and the total course credits of thatsemester. Itshall be expressed up to2nddecimalplace.

Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative performanceof a student in all the semesters.CGPA is the ratio of total credit points secured by a student invariouscoursesinall semestersandthesum of thetotal creditsof allcoursesinall thesemesters.Itisexpressedupto2nd decimalplace.

Programme: An Educational Programmeleadingtotheaward ofaDegree.

B.Tech.withMinordegree:

A student will be eligible to get B. Tech. with Minor Degree, if he/she acquires 18 additionalcredits.These should be acquired through registered courses offered by the Institution or throughMOOCsas equivalenttothecoursesofferedbytheInstitute.

B.Tech(Honors)

The B. Tech. (Honors) programs are proposed to choose for an area of specialization amongvarious emerging technologies in order to be a domain expert. A student will be eligible for B.Tech. (Honors) Degree, if he/she acquires an additional 20 credits. These should be acquiredthrough registered courses as per the respective courses offered by the Department/Institute orthroughSWAYAMMOOCs asequivalenttothecoursesofferedbythe Institute.

Transcript or Grade Card: Based on the grades earned, a grade certificate shall be issued to allthe registered students after every semester. The grade card will be displaying the course details(code, title, number of credits, grade secured) along with SGPA of that semester and CGPAearnedtillthatsemester.

Types of Courses: The Courses in/under B. Tech Program may be of three kinds' viz., Core,ElectiveandMandatory.

d) CoreCourse:-

There may be a Core Course in every semester and are to be compulsorily studied by a studentandis essentialrequirementforagivenProgramme.

e) ElectiveCourse:-

ElectiveCourseisacoursewhichcanbechosenbythestudentsfromapoolofCourses.Ingeneral,theelectivecourseis:

- Supportive tothedisciplineofstudy
- Providesanexpandedscopeofthecorecourses
- Nurturesstudent'sproficiency/skill

In case an elective is "Discipline centric" and is offered by the student's department itself, theelective is called **Professional elective**. On the contrary, if the elective is offered by otherdepartments wherein the students are at liberty to choose a course of their interest, the elective iscalledan"**OpenElective**."

f) MandatoryCourses(Non-CreditCourses)

AICTE considers that the Course work pertaining to certain subjects is essential and a' **pass** inthose subjects is compulsory as such for the award ofB.Tech degree. Such types of courses arereferred to as Mandatory **courses**. As AICTE feels that familiarity with the subject content ofthese coursesissufficient,butessential,only apassin each of these coursesis required.Therefore,these subjectsare includedinthe curriculumasnon-Creditcourses.

VIDYAJYOTHIINSTITUTEOFTECHNOLOGY

(AnAutonomousInstitution)

AziznagarGate,C.B.Post,Hyderabad-500 075,Telangana

ACADEMICREGULATIONSFORB.Tech.

WITHEFFECTFROMACADEMICYEAR2022-23(R22)

7 Under-

GraduateDegreeProgrammeinEngineering:VidyaJyothiInstituteofTechnologyoffersa4Year(8Semesters)**BachelorofTechnology**(B.Tech.)Degreeprogramme,underChoiceBasedCreditSystem(CBCS)inthefollowingBranchesofEngineering.

S.No	Branch
1.	CivilEngineering
2.	ElectricalandElectronicsEngineering
3.	MechanicalEngineering
4.	ElectronicsandCommunicationEngineering
5.	ComputerScienceandEngineering
6.	Informationtechnology
7.	ArtificialIntelligence
8.	ComputerScienceand Engineering(DataScience)
9.	ArtificialIntelligence&DataScience
10.	ComputerScience&Engineering(AI&ML)

Regulationsapplicableto anynewcoursesintroduced inlateryears

8 ELIGIBILITYFORADMISSION

2.5 Admission to the Under Graduate (UG) program shall be made either on the basis of themerit rank obtained by the candidate in the entrance test conducted by the Telangana StateGovernment (TS EAMCET) and on the basis of any other order of merit approved by theGovernmentfromtimetotime,includingadmissionsunderManagement/NRICategory.

2.6 TheGovernmentorderswithregardtotheadmissionsinvogueshallprevail.

2.7 The candidate should have passed the prescribed qualifying examination before the date ofAdmission.

2.8 Themediumofinstructionis**English**.

9 B.TechPROGRAMMESTRUCTURE

3.2 A student after securing admission shall complete the B.Techprogramme in a minimumperiod of **four** academic years (8 semesters), and a maximum period of **eight** academicyears (16 semesters) starting from the date of commencement of First year First semester,failingwhichthestudentshallforfeitseatinB.TechProgramme. Eachstudentshall secure 161 credits(withCGPA≥5),requiredforthecompletionoftheUnderGraduate Programme andtheawardoftheB.Tech.Degree.

3.2 UGC/ AICTE specified definitions/ descriptions are adopted appropriately for varioustermsand abbreviationsusedintheseacademicregulations/normsarelistedbelow.

3.2.1 SemesterScheme

All UnderGraduate Programmeis of 4 academicyears (8 semesters).Every academicyear shall be dividedinto two regular semesters known as the firstsemester and thesecondsemester.EverySemesterhas-
'ContinuousInternalEvaluation(CIE)'and'SemesterEndExamination(SEE)'underChoiceBasedCreditSystem(CBCS)asindicated by UGC, and the Curriculum/ Course structure as suggested by AICTE arefollowed.

3.2.2 CreditCourses

All Subjects/Courses are to be registered by the student in a semester to earn credits whichshall be assigned to each Subject/Course in a L: T: P: C (lecture periods: tutorial periods:practicalperiods:credits)structure basedonthe followinggeneralpattern.

- One credit for one hour/ week/ semester for one Theory/ Lecture (L) courses orTutorials(T)and,
- Onecreditfortwohours/week/semesterforlaboratory/practical(P)Courses.

Courses like Gender Sensitization, Environmental Science, Induction Program are mandatorycourses.Thesecourses willnotcarryanycredits.

3.2.4 Subject/CourseClassification

TheCollegehasfollowedalmostalltheguidelinesissuedbyAICTE/UGC.AllSubjects/CoursesofferedfortheUGProgrammesinEngineering(B.Tech.)arebroadly

classifiedasfollows.

ThegroupsofthesubjectsshallbeasgiveninthetablehereunderassuggestedbyAICTE.

S. No.	SubjectCategories
1	HumanitiesandSocialSciences(HS) Subjects: English, Management and the Courses dealing with PersonalityDevelopment
2	BasicSciences(BS)SubjectsincludingMathematics,PhysicsandChemistry
3	Engineering Sciences (ES): Engg. Workshop, Drawing, Fundamentals ofComputerScienceandCoursesdealingwiththebasicsofElectrical/Electronics/MechanicalEngineering
4	ProfessionalCore(PC)Subjects:Includescorecoursesrelatedtotheparentdiscipline /department/branchofEngineering
5	ProfessionalElective(PE)Subjects:Includeselectivecoursesrelatedtothe parent discipline / department / branch of engineering. Students has anoptiontoselectamongsttheofferedcourses
6	OpenElective(OE)Subjects:Electivecourseswhichincludeinter–disciplinarycoursesorcoursesinanareaoutsidetheparentdiscipline/
7	ProjectWork,Seminarand/orInternshipinIndustryorelsewherealongwithMini project.
8	MandatoryCourses(MC): Mandatorynon-creditcourses
9	**Minor/HonorsCourses** **Honors**: To facilitate the students to choose additional courses by deepdive into emerging areas in their own discipline. The Honors program shallbe offeredbythe parentdepartment. **Minor**:Students,whoaredesirousofpursuingtheirspecialinterestareas otherthantheirbranchofengineering,mayoptforadditionalcoursesin

B.TechYearWisedistribution ofcredits

S.No.	Year	Semester	RegularCurriculum	
			Credits	TotalCredits
1	st 1Year	I	20	**40**
		II	20	
2	nd 2Year	I	20	**40**
		II	20	
3	rd 3Year	I	20	**40**
		II	20	
4	th 4Year	I	20	**40**
		II	20	
TotalNo.ofCredits				**160**

10 COURSEREGISTRATION/DROPPING

4.3 Each studenthas tocompulsorily registerfor course workat the beginning of eachsemester aspertheschedulementionedintheacademiccalendar.Itisabsolutelynecessaryforthe studenttoregisterforCoursesintime.

4.4 A student would be allowed to register for an Additional Course only if the studentsatisfies theprerequisites.

4.3 Departments will notify at the time of registration about the minimum n umber o f students to be enrolled for a particular Open Elective to be offered.

4.4 Anystudentmaybebarred fromregisteringfor anycourseondisciplinarygrounds.

4.5 **Open Electives:** The students have to choose three Open Electives (OE-I, II& III) from the list of open electives given. However, the student cannot opt for an Open Elective Subjectofferedbyhis own(parent)department.

4.6 ProfessionalElectives:

Studentshavetoregisterfrom thelistofprofessionalelectivecoursesasprescribedinthe

coursestructureoftheprogramme.

11 ELECTIVECOURSESTOBEOFFERED

5.1 An Elective Course may be offered to the students, only if a minimum of 30 students optforit.

5.3 More thanonefacultymembermayofferthesamesubject(lab/practicalmaybeincluded withthecorresponding theorysubjectinthe same semester)inanysemester.

12 ATTENDANCE REQUIREMENTS

6.1 A studentshall maintain a minimum required attendance of 75% in AGGREGATE.He/She is eligible to write the Semester End Examinations only if the student acquires aminimum of 75% of attendance in class work aggregate of all the Subjects/Courses in thatSemester.

7.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic council on genuine medical grounds, based on the student's representation with supporting evidence. Student shall submit thesame asandwhensuchrequirementarisesbutnotatthe endofsemester.

7.3 Astipulated feeshallbepayabletowardscondonationofattendanceshortage.

7.4 Shortageofattendancebelow65%inaggregateshallinnocasebecondoned.

7.5 Students, whose shortage of attendance is not condoned, are not eligible to appear for SemesterEndExaminationsofthatsemester.Suchstudentsaredetainedandtheir registrationfortheexaminationstands cancelled.

7.6 A student detained due to shortage of attendancein a semester may seek re-admissionintothatsemester,asandwhenoffered,withinfourweeksfromthedateofthecommencement of class work. Academic regulations applicable to the semester in whichre-admission is sought shall be applicable to the re-admitted student. In case if there areany professional electives and/or open electives, the same may also be re-registered ifoffered. However, if those electives are not offered in the later semesters, then alternateelectives maybechosenfromthesamesetofelectivecoursesofferedunder thatcategory.

8 ACADEMICREQUIREMENTS

The following academic requirements have to be satisfied, in addition to the attendancerequirementsmentionedinitemno.6

24.6 A student shall be deemed to have satisfied the academic requirements and earned thecredits allotted to each subject/ course, if a studentsecures notless than 35% (14 marksout of 40 marks in the **Continuous Internal Evaluation**, not less than 35% (21 marks outof60marks)inthesemesterendexamination,andaminimumof40%(40marksoutof 100marks)inthesumtotaloftheCIE(ContinuousInternalEvaluation)andSEE(Semester End Examination) taken together; in terms of letter grades, this implies securing'C'gradeoraboveinthatsubject/course.

24.7 A student shall be deemed to have satisfied the academic requirements and earned thecreditsallotted toReal-timeResearch Project(or)FieldBasedResearch Project(or)Industry Oriented Mini Project (or) Internship (or) Seminar, if the student secures not lessthan40%ofmarksineachofthem.

The studentis deemed to havefailed,if he (i)does notsubmita report on IndustryOriented Mini Project/Internship, or (ii) not make a presentation of the same before theevaluation committee as per schedule, or (iii) secures less than 40% marks in Real-timeResearch Project(or) Field Based Research Project (or) Industry Oriented Mini Project(or)Internshipevaluations.

A student may reappear once for each of the above evaluations, when they are scheduledagain; if the student fails in such 'one reappearance' evaluation also, the student has toreappear forthesameinthenextsubsequentsemester,asand whenitisscheduled.

24.8 Promotionrules

S.No.	Promotion	Conditionstobefulfilled
1	FirstyearfirstsemestertoFirst yearsecondsemester	Regularcourse ofstudyofFirstyearfirstsemester and shallsatisfyattendancerequirements.

2	FirstyearsecondsemestertoSecondyearfirstsemester	**(iii)** RegularcourseofstudyofFirstyearsecondsemesterandshallsatisfyattendancerequirements. **(iv)** Must have secured at least 20 credits out of 40 creditsi.e.,50%creditsuptoFirstyearsecondsemesterfromall the relevant regular and supplementaryexaminations,whetherthe student takesthose examinationsornot.
3	Secondyearfirstsemesterto Second yearsecondsemester	RegularcourseofstudyofSecondyearfirstsemesterand shallsatisfyattendancerequirements.
4	Second yearsecondsemestertoThirdyear first semester	**(iii)** Regular course of study of Second year secondsemesterandshallsatisfyattendancerequirements. **(iv)** Musthavesecuredatleast48creditsoutof80creditsi.e., 60% credits up to Second year second semesterfrom all the relevant regular and supplementaryexaminations,whetherthe student takesthose examinationsornot.
5	Third year first semester toThirdyearsecondsemester	RegularcourseofstudyofThirdyearfirstsemester andshallsatisfyattendancerequirements.
6	Third year second semestertoFourthyearfirstsemester	**(iii)** Regular course of study of Third year secondsemestershallsatisfyattendancerequirements. **(iv)** Must have secured at least 72 credits out of 120credits i.e., 60% credits up to Third year secondsemester from all the relevant regular andsupplementaryexaminations,whetherthestudent takesthoseexaminationsornot.
7	Fourth year first semester toFourthyearsecondsemester	RegularcourseofstudyofFourthyearfirstsemesterandshallsatisfyattendancerequirements.

24.9 A Student (i) shall register for all Courses/Subjects covering 160Credits as specified andlisted in the course structure, (ii) fulfils all the attendance and academic requirements for160credits,(iii)earnall160creditsbysecuringSGPA≥5.0(ineachsemester),and

CGPA (at the end of each successive semester) ≥5.0, (iv)**passes all the mandatorycourses**, to successfully complete the under graduate programme. The performance of thestudent in these 160 credits shall be taken into account for the calculation of 'the finalCGPA (**at the end of under graduate programme**), and shall be indicated in the gradecard/marksmemoofIV-yearII-semester.

24.10If a student register for '**extra subjects**' (in the parent department or other department /branchesofEngineering)otherthanthoselistedsubjectstotalingto160creditsasspecified in the course structure of his/her department, the performances in those '**extrasubjects**' (although evaluated and graded using the same procedure as that of the required160 credits) will not be considered while calculating the SGPA and CGPA.For such'**extra subjects**' registered, percentage of marks and letter grade alone will be indicated inthe grade card as a performance measure, subject to completion of the attendance andacademic requirementsasstatedinregulationsItems6and7.1–7.4above.

24.11 A student eligible to appear in the Semester End Examination for any subject/ course, butabsent for it or failed (thereby failing to secure 'C' grade or above) may reappear for thatsubject/ course in the supplementary examination as and when conducted. In such cases,internal marks (CIE) assessed earlier for that subject/ course will be carried over, andaddedtothemarksobtainedintheSEEsupplementaryexaminationforevaluatingperformanceinthatsubject.

24.12 A student detained in a semester due to shortage of attendance may be re-admitted in thesame semester in the next academic year for fulfillment of academic requirements. Theacademic regulations underwhich a studenthas been readmittedshallbe applicable.However, no grade allotments or SGPA/ CGPA calculations will be done for the entiresemesterinwhichthe studenthasbeendetained.

24.13A student detained due to lack of Credits in any year, may be readmitted after fulfillmentof the Academic Requirements, with the Academic Regulations of the Batch into which hegets readmitted. If there are any Professional Electives/Open Electives, the same may alsobe re-registered if offered. However, if those Electives are not offered in later Semesters,thenalternateElectivesmaybechosenfromthesamesetofElectiveSubjectsoffered

underthatcategory.

24.14 A student detained due to lack of credits, shall be promoted to the next academic yearonly after acquiring the required number of academic credits. The academic regulationsunderwhichthe studenthasbeenreadmittedshallbeapplicabletohim.

24.15 Student, who fails to earn 160 credits as indicated in the course structure within eightacademic years from the year of his/her admission, shall forfeit the seat in B. Tech. courseandadmissionstands cancelled.

24.16 A student with a final CGPA (at the end of the UGP) < 5.00 will not be eligible for theAwardoftheDegree.

25 EVALUATION-DISTRIBUTIONANDWEIGHTAGEOFMARKS

25.1 The performance of a student in every subject/course (including Practicals and ProjectStage – I & II) will be evaluated for 100 marks each, with 40 marks allotted for CIE(ContinuousInternalEvaluation) and 60marksforSEE(Semester End-Examination).

25.2 In CIE, for theory subjects, during a semester, there shall be two mid-term examinations.Each Mid-Term examination consists of two parts i) Part – A for 10 marks, ii) Part – B for20marks withatotaldurationof2hoursasfollows:

2. MidTermExaminationfor30marks:

   a. Part- A:Objective/quizpaperfor10marks.

   b. Part–B:Descriptivepaperfor20marks.

The objective/quiz paper is set with multiple choice, fill-in the blanks and match thefollowing type of questions for a total of 10 marks. The descriptive paper shall contain 6fullquestionsoutofwhich, thestudenthastoanswer4questions,eachcarrying5marks.

While the first mid-term examination shall be conducted on 50% of the syllabus, thesecondmid-termexaminationshallbe conductedonthe remaining50%ofthe syllabus.

Theremaining10marksofContinuousInternalAssessment(outof40) aredistributedas:

3 Assignmentfor5marks. (Averageof2Assignmentseachfor5marks).

Five(5)marksareallocatedforassignments(asspecifiedbythesubjectteacherconcerned). The first assignment should be submitted before the conduct of the first mid-term examination, and the second assignment should be submitted before the conduct ofthe second mid-term examination. The average of the two assignments shall be taken asthe finalmarksforassignment(for5marks).

4 SubjectViva-Voce/PosterPresentation/ParticipatoryLearning/GroupActivities/CaseStudyonatopicinthe concerned subjectfor5 marksbeforeIIMid-termExamination.

The Student, in each subject, shall have to earn 35% of marks (i.e. 14 marks out of 40marks) in CIE 35% of marks (i.e. 21 marks out of 60) in SEE and however overall 40% ofmarks(i.e.40marksoutof100marks)bothCIEandSEEmarksputtogether.

The student is eligible to write Semester End Examination of the concerned subject, if thestudentscores≥35%(14 marks)of40 ContinuousInternalExamination(CIE)marks.

In case, the student appears for Semester End Examination (SEE) of the concerned subjectbut not scored minimum 35% of CIE marks (14 marks out of 40 internal marks), hisperformanceinthatsubjectinSEEshallstand cancelledinspiteofappearingtheSEE.

ThedetailsofEnd semester questionpaper patternisasfollows:

25.2.1 The Semester End Examinations (SEE), for theory subjects, will be conducted for 60marksconsistingoftwopartsviz.i)Part-Afor10marks,ii)Part-Bfor50marks.

- Part-A is a compulsory question which consists of ten sub-questions from all unitscarryingequalmarks
- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each.Each of these questions is from each unit and may contain sub-questions.For eachquestion there will be an “either” “or” choice, which means that there will be twoquestions fromeachunitandthestudentshouldanswer eitherofthetwoquestions.
- ThedurationofSemesterEndExamination is3 hours.

25.2.2 For the subject, Computer Aided Engineering Graphics, the Continuous Internal Evaluation (CIE)and Semester End Examinations (SEE) evaluation pattern is same as for other theory subjects.

25.3 For practical subjects there shall be a Continuous Internal Evaluation (CIE) during thesemesterfor 40 marks and 60 marksfor semesterend examination.Out of the 40

marksforinternalevaluation:

5. Awrite-uponday-to-dayexperimentinthelaboratory(intermsofaim,components/procedure, expected outcome)which shall be evaluatedfor10marks
6. 10 marks for viva-voce (or) tutorial (or) case study (or) application (or) posterpresentationofthecourseconcerned.
7. Internal practical examination conducted by the laboratory teacher concernedshallbeevaluatedfor10marks.
8. The remaining 10 marks are for laboratory project whichconsists of the Design(or)Software/HardwaremodelPresentation(or)AppDevelopmentorPrototypePresentationsubmissionwhichshallbeevaluatedaftercompletionoflaboratorycourse beforethe semesterendPracticalexaminations.

The Semester End Examination shall be conducted with an external examiner and thelaboratory teacher. The external examiner shall be appointed from other colleges whichwillbedecidedbytheexaminationbranchoftheCollege.

IntheSemesterEndExaminationheldfor3hours, total 60marksaredividedandallocatedas shownbelow:

6. 10marksforwrite-up
7. 15forexperiment/program
8. 15for evaluationofresults
9. 10 marks for presentation on another experiment/program in the same laboratorycourse and
10. 10marksfor viva-voceonconcernedlaboratorycourse

- Thestudent,ineachsubject,shall have toearn35%ofmarks(i.e.14marksout of 40marks) in CIE, 35% of marks (i.e. 21 marks out of 60) in SEE and Overall40% of marks (i.e. 40 marks out of 100 marks) both CIE and SEE marks puttogether.
- ThestudentiseligibletowriteSemesterEndExaminationoftheconcernedsubject, if the student scores ≥ 35% (14 mark out of 40 marks) inContinuousInternalExamination(CIE).

- In case, the student appears for Semester End Examination (SEE) of the concernedsubject but not scored minimum 35% of CIE marks (14 marks out of 40 internalmarks), his performance in that subject in SEE shall stand cancelled inspite ofappearingtheSEE.

25.4 The evaluation of courses having ONLY internal marks in I Year I Semester and IIYearIISemesteris asfollows:

IYearISemestercourse(ex.,ElementsofCE/ME/EEE/ECE/CSE):Theinternalevaluation is for 50 marks and it shall take place during I Mid-Term examination and IIMid-Term examination. The average marks of two Mid-Term examinationsare the final for50 marks. Student shall have to earn 40%, i.e 20 marks out of 50 marks from average ofthe two examinations. There shall be NO external evaluation. The student is deemed tohave failed, if he (i) is absent as per schedule, or (ii) secures less than 40% marks in thiscourse.

For CSE/IT and allied branches the Continuous Internal Evaluation (CIE) will be for 50 marks. Each Mid-Term examination consists of two parts i) Part – A for 20 marks, ii) Part – B for 20 marks with a total duration of 2 hours.

Part A: Objective/quiz paper is set with multiple choice, fill-in the blanks and match the following type of questions for a total of 20 marks. **Part B:** Descriptive paper shall contain 6 full questions out of which, the student has to answer 4 questions, each carrying 5 marks.

The remaining 10 marks of Continuous Internal Evaluation are for Assignment (5 marks) and Subject Viva-Voce/PPT/Poster Presentation/ Case Study (5 marks) and the evaluation pattern will remain same as for other theory subjects.

For all other branches, the Continuous Internal Evaluation (CIE) will be for 50 marks. Out of the 50 marks for internal evaluation:

a) A write-up on day-to-day experiment in the laboratory (in terms of aim, components/procedure, expected outcome) which shall be evaluated for 10 marks

b) 10 marks for viva-voce (or) tutorial (or) case study (or) application (or) poster presentation of the course concerned.

c) Internal practical examination conducted by the laboratory teacher concerned shall be evaluated for 15 marks.

d) The remaining 15 marks are for Laboratory Report/Project and Presentation, which consists of the Design (or) Software / Hardware Model Presentation (or) App Development (or) Prototype Presentation submission which shall be evaluated after completion of laboratory course and before semester end practical examination.

II Year II Semester Real-Time (or) Field-based Research Project course: The internalevaluation is for 50 marks and it shall take place during I Mid-Term examination and IIMid-Term examination. The average marks of two Mid-Term examinations is the final for50 marks.Student shall have to earn 40%, i.e 20 marks out of 50 marksfrom average ofthetwo examinations.There shallbe NOexternalevaluation.

The student is deemed to have failed, if he (i) does not submit a report on the Project, ordoes not make a presentation of the same before the internal committee as per schedule,or(ii)secureslessthan40%marksinthis course

25.5 Incase,afewstudentsareabsentduetohealthreasonsorany otherunavoidablecircumstances, or if a student wish to improve his/her performance in the internal marks athirdmid-termexaminationwillbeconductedonpaymentoffeesfixedbytheexaminationbranch.The testwillbe conductedinallthe unitsofthe subject.

25.6 There shall be an Industry training / Internship / Skill Development Courses / Paperpresentation in reputed journal / Industry Oriented Mini Project in collaboration with anindustry of their specialization. Students shall register for this immediately after II-Year IISemesterExaminationsandpursueitduringsummervacation/semesterbreak&duringIIIYear without effecting regular course work. Internship at reputed organization/ Skilldevelopmentcourses / Paper presentation in reputed journal / Industry Oriented MiniProject shall be submitted in a report form and presented before the committee in III-YearIIsemesterbeforeEnd SemesterExamination.Itshall be evaluatedfor100 external marks. The committee consists of an External Examiner, Head of the Department, InternalSupervisor and a Senior Faculty Member of the Department. There shall be NO internalmarks for Industry Training (or)Internship (or) Mini-Project (or) Skill DevelopmentCourses(or)PaperPresentationinreputedjournal(or)IndustryOriented MiniProject

25.7 DesignandDrawing

Forthesubjecthavingdesignand/ordrawing,(suchasEngineeringGraphics,EngineeringDrawing,andMachineDrawing),thedistribution shallbe 40marksforInternal Evaluation (20 marks for day-to-day work and 20 marks for internal tests) and 60marks for Semester End Examination. There shall be two internal tests in a semester andaverage of two examinationsshall be considered for the award of marks for internalexamination.

25.8 The UG project shall be initiated at the end of the IV Year I Semester and the duration

ofthe project work is one semester. The studentmust present Project Stage– I during IVYear I Semester before II Mid examinations, in consultation with his Supervisor, the title,objectiveandplanofactionofhisProjectworktothedepartmentalcommitteeforapproval before commencement of IV Year II Semester.Only after obtaining the approvalofthedepartmentalcommittee,the studentcanstarthis projectwork.

25.9 UG project work shall be carried out in two stages: Project Stage – I for approval ofproject before Mid-II examinations in IV Year I Semester and Project Stage – II during IVYear II Semester. Student has to submit project work report at the end of IV Year IISemester. The project shall be evaluated for 100 marks before commencement of SEETheoryexaminations.

25.10 For Project Stage – I, the departmental committee consisting of Head of the Department,project supervisor and a senior faculty member shall approve the project work to beginbefore II Mid-Term examination of IV Year I Semester. The student is deemed to be noteligible to register for the Project work, if he does not submit a report on Project Stage - Iordoesnotmakeapresentationofthesamebeforetheevaluationcommitteeasper schedule. A student who has failed may reappear once for the above evaluation, when it isscheduled again; if he fails in such 'one reappearance' evaluation also, he has to reappearforthesameinthenextsubsequentsemester,asand when itisscheduled.

25.11 For Project Stage – II, the external examiner shall evaluate the project work for 60 marksand theinternal projectcommittee shall evaluate itfor 40 marks. Out of 40internalmarks,thedepartmentalcommitteeconsistingofHeadoftheDepartment,ProjectSupervisor and a Senior Faculty Member shall evaluate the project work for 20 marks andProject Supervisor shall evaluate for 20 marks. The topics for Industry Oriented MiniProject/ Internship/SDC etc. and the main Project shall be different from the topic alreadytaken. The student is deemed to have failed, if he (i) does not submit a report on theProject, or (ii) does not make a presentation of the same before the External Examiner asper schedule, or (iii) secures less than 40% marks in the sum total of the CIE and SEEtakentogether.

For conducting viva-voce of project, Principal/Director of the college selects an externalexaminer from the list of experts in the relevant branch submitted by the Head of theDepartment.

Astudent,whohasfailed,may reappearoncefortheaboveevaluation,whenitisscheduled again; if student fails in such 'one reappearance' evaluation also, he has toreappear forthesameinthenextsubsequentsemester,asand whenitisscheduled

25.12 SeminarPresentation

There shall be a seminar presentation in IV-year II Semester. For the seminar, the studentshall collect the information on a specialized topic and prepare a technical report, showinghis understanding of the topic, and submit it to the department. It shall be evaluated by thedepartmental committee consisting of Head of the Department, Seminar Supervisor and aSenior Faculty member. The seminar report shall be evaluated for 100 marks. There shallbenoSEEorexternalexaminationforthe seminar.

If the student fails to present the Seminar as required in the IV-year II Semester He mayreappear for the seminar when they are scheduled again (within one month); if he fails insuch 'one reappearance' evaluation also, he has to reappear for the same in thenextsubsequentSemester,asandwhenitis scheduled.

25.13 A student shall be given one time chance to re-register for a maximum of two subjects: ina semester

- If theinternal marks secured by a studentin the**continuous internal evaluationmarks for 40** (Sum of average of two mid-term examinations consisting of objective&descriptiveparts,averageof2assignmentsandsubjectvivavoce/PPT/Posterpresentation/Case study on a topic in the concerned subject) are less than 35% andfailedinthosesubjects

A studentmustre-register for the failed subject(s) for 40 marks within four weeks ofcommencementoftheclassworkinnextacademicyear.

In the event of the student taking this chance, his Continuous Internal Evaluation marks for40 and Semester End Examination marks for 60 obtained in the previous attempt standcancelled.

Subject	InternalValuation Marks	External ValuationMarks	TotalMarks
Theory/Engineering Drawing	40	60	100
MiniProject	0	100	100
Seminar	100	0	100
MajorProject	40	60	100

25.14 Candidates shall be permitted to apply for recounting/revaluation of SEE scripts within 2weeksfromthe dateofreleaseofresults,withapaymentofprescribedfee.

25.15 NomarksorlettergradesshallbeallottedforMandatory/Non-CreditCourses.OnlyPass/FailshallbeindicatedinGradeCard.

26 B.TechwithMinorProgram

The Institution has introduced the **Bachelor of Technology in a particular specializationwith minor program** *(For eg., B. Tech. in Electronics & Communication EngineeringwithMinor inAI&ML)*fromAY.2021-22.

The Bachelor of Technology (B.Tech.) with minor programs offered by VJIT focuses onthe fundamental principle of Engineering, where the development of critical & analyticalthinking and the ability to develop a distinctive approach to any given problem statementshallbe the drivingfactorthatfuels the pedagogicdiscourse.

A student will be eligible to get B. Tech. with Minor Degree, if he/she completes anadditional 18 credits. These should be acquiredthrough registered courses as per therespectivecoursesofferedbytheInstituteorthroughMOOCs coursesasmentionedAnnexure-I,asequivalenttothe courses offeredbythe Institute.

DetailsaregivenintheAnnexure–I

27 B.Tech(Honors)

The B. Tech. (Honors) programs are proposed to choose for an area of specializationamong various emerging technologies in order to be a domain expert. A student will beeligible to get B. Tech. (Honors) Degree, if he/she completes an additional 20 credits.These should be acquired through registered courses as per the respective courses offeredby the institution or through SWAYAM MOOCs as equivalent to the courses offered bythe Institute.

Detailsaregivenin theAnnexure-II

28 GRADINGPROCEDURE

28.1 Grades will be awarded to indicate the performance of students in each theory subject,laboratory/practical's/Seminar/IndustryOrientedMiniProject/InternshipandProject Stage –I &II. Based on the percentage of marks obtained (Continuous Internal EvaluationandSemester End Examination, both taken together) as specified item7 and 8 of above, acorrespondinglettergrade shallbegiven.

28.2 Asameasureofthestudent'sperformance,a10-pointAbsoluteGradingSystemusingthefollowingLetterGradesandcorresponding percentageofmarksshallbefollowed.

Letter Grade	Performance	Grade Points	%ofmarksSecured(ClassIntervals)
O	Outstanding	10	Greaterthanorequalto90%
A+	Excellent	9	80%andlessthan90%
A	Very Good	8	70%andlessthan80%
B+	Good	7	60%andlessthan70%
B	Average	6	50%andlessthan60%
C	Pass	5	40%andlessthan50%
F	Fail	0	Below40%
AB	Absent	0	Absent

28.3 AStudentwhohasobtainedan**'F'**gradeinanysubjectshallbeconsidered'failed'andis required to reappear as a 'supplementary student' in the semester End Examination asand when conducted. In such cases, Internal Marks in those subjects will remain the sameasthoseobtainedearlier.

28.4 To a student who has not appeared for a semester end examination in any subject, **'Ab'**grade will be allocated in that subject, and he is deemed to have **'failed'**. A Student will berequired to reappear as a 'Supplementary Student' in the Semester End Examination, asand when conducted. In this case also, the internal marks in those subjects will remain thesame as thoseobtainedearlier.

28.5 A letter grade does not indicate any specific percentage of marks secured by the student,butitindicatesonlytherange ofpercentageofmarks.

28.6 In general, a student shall not be permitted to repeat any subject/course(s) only for thesake of 'Grade Improvement' or 'SGPA/CGPA Improvement'. However, he has to repeatall the Subject/Courses pertaining to that Semester when he is detained due to shortage ofattendance.

28.7 A student earns grade point (GP) in each subject/ course, on the basis of the letter gradesecuredinthatsubject/course.Thecorresponding'creditpoints'(CP)arecomputedby multiplyingthegradepointwithcreditsforthatparticularsubject/course.

Creditpoints(CP)=gradepoint(GP)xcredits….Forasubject/course

TheGradePointAverage(GPA)willbecalculatedaccordingtotheformula:

$$GPA=\frac{\sum C_i G_i}{\sum C_i}$$

Where C_i= Number of credits allotted to the i^{th} Subject and G_i= Grade points allotted for allcoursespassedinthatsemester

28.8 ThestudentpassestheSubject/ CourseonlywhenhegetsGP ≥5(P Gradeorabove).

28.9 The Semester Grade Point Average (SGPA) is calculated by dividing the sum of creditpoints (∑CP) secured from all subjects/ courses registered in a semester, by the totalnumber of credits registered during that semester. SGPA is rounded off to two decimalplaces.SGPAis thus computedas

$$SGPA=\frac{\sum \text{CourseCredits}(C_i)\times\text{GradePoints}(G_i)}{\sum \text{Course Credits }(C_i)}$$

WhereC_i=Numberofcredits allottedtothe i^{th}Course

G_i=Gradepointsallottedtoi^{th}Coursepassedinthatsemester

$\sum C_i$=Totalnumberofcreditsfor allcoursesregisteredinthatsemester

And'i' isthecourseindicator index(takesintoaccountallcourses inasemester).

28.10 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulativeperformance of a studentin all semesters considered for registration. The CGPA is theratio of the total credit points secured by a student in all registered courses in all semesters,and the total number of credits registered in all the semesters. CGPA is rounded off to twodecimalplaces.CGPAisthuscomputedfrom theIyearIIsemesteronwardsattheendof eachsemesterasperthe formula

$$CGPA = \frac{\sum \text{Course Credits}(C_j) \times \text{GradePoints}(G_j)}{\sum \text{CourseCredits } (C_j)}$$

Where

C_j=NumberofcreditsallottedtothejthCourse

G_j=GradepointsallottedtojthCoursepassedup tothatsemester

$\sum C_j$=Totalnumberofcreditsfor allcoursesregistereduntilthatsemester

And'j'isthesubjectindicatorindex(takesintoaccountallsubjectsuntilthesemester)

AfterregistrationandcompletionofIyearIsemester,theSGPA ofthatsemesteritselfmaybetakenas theCGPA,astherearenocumulative effects.

IllustrationofcalculationofSGPA:

Course	Credits	LetterGrade	GradePoints	CreditPoints
Course1	4	A	8	4x8=32
Course2	4	O	10	4x10=40
Course3	4	C	5	4x5=20
Course4	3	B	6	3x6=18
Course5	3	A+	9	3x9=27
Course6	3	C	5	3x5=15
	21			152

SGPA =152/21=7.24

28.11 llustrativeExample:

An illustrative example given in below Table indicates the use of the above two equations incalculating SGPA and CGPA, both of which facilitate the declaration of academic performance ofa student, at the end of a semester and at the end of successive semesters respectively. Both ofthem shall be normally calculated up tothe second decimal position, so that the*CGPA*,inparticular, can be made use of in awarding a rank for the student's performance in a class orcollege. If two students get the same *CGPA*, the tie should be resolved by considering the numberoftimesastudenthasobtainedhigher*SGPA;*But,ifitisnotresolvedevenatthisstage,the numberoftimesastudenthasobtainedhighergradeslikeO,A, Betcshallbetakenintoaccountinrankorderingofthe studentsinaclass.

Example:

Yearand Semester	Course No.	Credits	Grade	Grade Points	Credit Points
IYearI Semester	XX101	5	A	8	40
IYearI Semester	XX102	4	F	0	00
IYearI Semester	XX103	3	A+	9	27
IYearI Semester	XX104	4	F	0	00
IYearI Semester	XX105	5	C	5	25
IYearI Semester	XX106	5	A	8	40
Total		26(18*)			132
SGPA=132/26=5.08CGPA=5.08					
IYearIISemester	XX107	5	B+	7	35
IYearIISemester	XX108	4	A	8	32
IYearIISemester	XX109	3	C	5	15
IYearIISemester	XX110	5	B	6	30
IYearIISemester	XX111	4	A+	9	36
IYearIISemester	XX112	2	F	0	00
IYearIISemester	Xx113	2	A	8	16
IYearIISemester					
Total		25(23*)			164
SGPA=164/25=6.56CGPA= 296/51=5.80					

*TotalNo.ofcreditsexcludingthosewith'F';thisisparticularlyimportanttokeeptrackofthenumberofcredits earnedbya studentuptoanysemester.

The above illustrated calculation process of CGPA will be followed for each subsequent semesteruntil 8th semester. The CGPA obtained at the end of 8th semester will become the final CGPAsecuredforentire B.Tech.Programme.

28.12 Formeritrankingorcomparisonpurposesoranyotherlisting,onlythe‘roundedoff’valuesofthe CGPAwillbeused.

28.13 Forcalculationslistedinregulations11.7to11.10,performanceinfailedsubjects/courses (securing F grade) will also be taken into account, and the credits of such subjects/courses will also be included in the multiplications and summations. After passing thefailed subject(s) newly secured letter grades will be taken into account for calculation ofSGPAand CGPA.However,mandatorycourseswillnotbetakeninto consideration.

SGPA and CGPA of a semester will be mentioned in the semester Memorandum of Grades if allsubjects of that semester are passed in first attempt. Otherwise, the SGPA and CGPA shall bementioned only on the Memorandum of Grades in which sitting he passed his last exam in thatsemester.

29 EARNINGOFCREDITS

A student shall be considered to have completed a Course successfully and earned thecreditsifhe/shesecuresanacceptablelettergradeintherange‘O’to‘P’.Lettergrade'F'in anyCourseimpliesfailureofthe studentinthat Course and nocreditsearned.

30 PASSINGSTANDARDS

30.1 Astudentshallbedeclaredsuccessfulor‘passed’inasemester,ifhesecuresaGP≥5(‘C’ gradeorabove)ineverysubject/courseinthatsemester(i.e.whenthestudentgetsanSGPA ≥ 5.0 at the end of that particular semester); and he shall be declared successful or ‘passed’ intheentireundergraduateprogramme,onlywhengetsaCGPA≥5.00(‘C’gradeorabove)fortheaw ardofthedegreeasrequired.

30.2 Afterthecompletionofeachsemester,agradecardorgradesheetshallbeissuedtoalltheregistered students of that semester, indicating the letter grades and credits earned. It willshow the details of the courses registered (course code, title, no. of credits, grade earned, etc.)and creditsearned.ThereisNOexemptionofcreditsinanycase.

30.3 A Student shall be declared successful or ‘passed’ in any Non-Credit Subject/ Course, ifhesecures aminimumofPgrade.

30.4 After thecompletionofeach Semester,aGradeCard orGradeSheet(orTranscript)shall

be issued to all the registered students of that semester, indicating the Letter Grades andCreditsearned.Itwillshowthedetailsofthecoursesregistered(CourseCode,Title,No.ofCredits,Grade Earnedetc.),Credits earned,SGPA,andCGPA.

31 DECLARATION OFRESULTS

31.1 ComputationofSGPAand CGPAaredone usingtheprocedure listedin11.7 TO11.10.

31.2 For final percentage of marks equivalent to the computed final CGPA, the followingformulamaybeused.

$$\%ofMarks = (finalCGPA - 0.5) \times 10$$

32 AWARDOFDEGREE

32.1 A student who registers for all the specified subjects/ courses as listed in the coursestructure and secures the required number of 160 credits (with CGPA $\geq$ 5.0), within 8academicyearsfrom the date of commencementof the firstacademicyear,shall bedeclared to have 'qualified' for the award of B.Tech. degree in the branch of Engineeringselectedatthetimeofadmission.

32.2 A student who qualifies for the award of the degree as listed in item 15.1 shall be placedinthefollowingclasses

32.3 A student with final CGPA (at the end of the undergraduate programme) > 8.00, andfulfillingthefollowingconditions-shallbeplacedin'FirstClasswithDistinction'.

However,he/she

(iii) Should have passed all the subjects/courses in 'First Appearance' within the first 4academic years (or 8 sequential semesters) from the date of commencement of first yearfirstsemester.

(iv) Shouldnothavebeendetainedorpreventedfromwritingthesemesterendexaminationsinanysemesterduetoshortageofattendanceoranyotherreason.

A student not fulfilling any of the above conditions with final CGPA > 8 shall be placedin'FirstClass'.

32.4 Students with final CGPA (at the end of the undergraduate programme) ≥ 7.0 but <8.00shallbeplacedin'FirstClass'.

32.5 Students with final CGPA (at the end of the undergraduate programme)≥ 6.00 but<7.00,shallbeplacedin'SecondClass'.

32.6 All other students who qualify for the award of the degree (as per item 15.1), with finalCGPA (at the end of the undergraduate programme)≥ 5.00 but < 6, shall be placedin'passclass'.

32.7 A student with final CGPA (at the end of the undergraduate programme) < 5.00 will notbe eligiblefortheawardofthedegree.

33 CONSOLIDATEDGRADE CARD

A consolidated grade card containing credits & grades obtained by the candidates will beissuedaftercompletionofthefouryears B.TechProgram.

34 WITHHOLDINGOF RESULTS

If the student has not paid the fees to the College at any stage, or has dues pending due toany reason whatsoever, or if any case of indiscipline is pending, the result of the studentmay be withheld, and the student will not be allowed to go into the next higher semester.The award or issue of the degree may also be withheld in such cases and the matter will bereferredtoCollegeAcademic Committeeforfinaldecision.

35 TRANSITORYREGULATIONS

35.1 Discontinued, detained for attendance, detained for want of credits, or failed students areeligible for readmission as and when the course is offered during the subsequent academicyearas perthecollegeadmissionprocedures.

35.2 Students on transferfrom anon-autonomousorfrom anautonomouscollegeshallcompleteallthecoursesoftheconcernedprogrammenotcoveredint heearlierorganization. However, he/she should take the remaining courses in the programme alongwiththeotherstudents.

35.3 Thereshallbenobranchtransfersafterthecut-offdateofadmissions madeintheB.Tech.Iyear.

36 TRANSCRIPTS

After successful completion of the total programme of study, a Transcriptcontainingperformance of all academic years will be issued as a final record. Duplicate transcriptswillalsobeissuedifrequiredafterthe paymentofrequisitefee.

37 SUPPLEMENTARYEXAMINATIONS

InadditiontotheRegularendsemesterexaminations,SupplementaryExaminationsforthe previoussemesters willbe conductedalongwithEndSemesterExaminations.Astudent can appear for any number of supplementary examinations till he/she clears allcourseswhichhe/shecouldnotclearinthefirstattempt.However,themaximumstipulatedperiodcannotberelaxedunderanycircumstances.

38 GRADUATIONCEREMONY

38.1 The College shall have its own annual Graduation Ceremony for the award of degrees tostudents completing the prescribed academic requirements in each case, in consultationwiththe Universityandbyfollowingtheprovisionsinthe Statute.

38.2 The College shall institute Prizes and Awards to meritorious students, for being givenawayannuallyattheGraduationCeremony.

39 **TERMINATION**OFTHEPROGRAM

Theadmissionofastudenttotheprogrammaybeterminatedandthestudentmaybeaskedtoleave the Institute inthefollowingcircumstances:

- IfthestudentfailstosatisfytheAcademicrequirementsoftheprogramwithinthemaximum periodstipulatedforthatprogram.
- Ifthestudentfailstosatisfythenormsofdisciplinespecifiedbytheinstitutefromtime totime.

40 NON-CREDITCOURSES(MandatoryCourses)

40.1 Requirementof75%attendanceasperthecollegeregulationsiscompulsoryofcompletingtheMandatorycourses.

40.2 SpecifiednumberofMandatoryCoursesamongthedesignatedonesiscompulsoryrequirementforallthe studentsfortheawardofB.Tech.Degree.

40.3 Althoughthesecoursesdonotcarryanycredits,performanceinthesesubjectsisevaluatedfollowingtheprocedureadoptedforothersubjectswiththesamemarks.However,theirperformancewillbeindicatedinthestudent'smemoofmarksasSatisfactory/Unsatisfactory.

MALPRACTICESRULES

DISCIPLINARYACTIONFOR/IMPROPERCONDUCTINEXAMINATIONS

	NatureofMalpractices/Improperconduct	**Punishment**
	Ifthestudent:	
1.(a)	Possesses or keeps accessible in examination hall, anypaper,notebook,programmablecalculators,cellphones, pager, palm computers or any other form ofmaterial concerned with or related to the subject of theexamination(theory orpractical) inwhichstudent isappearingbuthasnotmadeuseof(materialshallincludeanymarks onthebodyofthestudentwhichcan beused as an aidin thesubjectof theexamination)	Expulsionfromtheexaminationhallandcancellationoftheperformanceinthatsubjectonly.
(b)	Gives assistance or guidance or receives it from anyotherstudentorallyorbyanyotherbodylanguagemethods or communicates through cell phones with anystudentorpersonsinoroutsidetheexamhallin respect ofanymatter.	Expulsionfrom the examination hall and cancellationofthe performance in that subject Only of all the studentsinvolved. In case of an outsider, he will be handed over tothepolice andacaseisregisteredagainsthim.
2.	Has copiedinthe examination hall from any paper,book,programmablecalculators,palmcomputersor any other form of material relevant to the subject of theexamination(theoryorpractical)inwhichthestudent isAppearing.	Expulsion from the examination hall and cancellation of theperformanceinthatsubjectonly.
3.	ImpersonatesanyotherstudentinConnectionwiththeexamination.	The student who has impersonated shall be Expelled fromexamination hall. The student is also debarred and forfeitstheseat.Theperformanceoftheoriginalstudentwhohas beenimpersonated,shallbecancelledinallthesubjectsof

		theexamination(includingpractical'sandprojectwork)already appearedandshallnotbeallowedtoappearforexaminationsofthe remainingsubjectsofthatSemester/year.Thestudentisalsodeba rredfortwoconsecutivesemestersfromclassworkandAllExami nations.Thecontinuationofthecoursebythestudentissubjecttot heacademicregulationsinconnectionwithForfeitureofseat.Ifth eimposterisanoutsider,hewillbehandedovertothe police andacaseisregisteredagainsthim.
4.	Smuggles inthe answerbookoradditionalsheetortakes outorarranges To send outthequestionpaperduringtheexamination or answer book or additional sheet, duringoraftertheExamination .	Expulsionfromtheexaminationhallandcancellationofperforma nce in that subject and all the othersubjects thestudenthasalreadyappearedincludingpracticalexaminations and project work and shall not be permitted forthe remaining examinations of the subjects of that Semester/year.Thestudentisalsodebarredfortwoconsecutivese mesters fromclassworkand All Examinations. The continuation of the course by thestudentissubjecttotheacademic Regulationsin connection with Forfeitureofseat.
5.	Uses objectionable, abusive or offensive languageinthe answer paper or in letters to the examiners or writestotheexaminerrequestinghimtoawardpassMarks.	Cancellationoftheperformanceinthatsubject.
6.	Refusestoobeytheordersofthechiefsuperintendent/assis tant superintendent / any officeron duty or misbehaves or creates disturbance of anykindinandaroundtheexaminationhallororganizesaw alkoutorinstigatesotherstowalkout,orthreatens the officer-in charge or any person on dutyin or outside the examination hall of any injury to hisperson or to any of his relations whether by words,eitherspokenorwrittenorbysignsorbvisiblerepre sentation, assaults the officer-in- charge, or anyperson on duty in or outside the examination hall orany of his relations, or indulges in any other act ofmisconduct or mischief which result in damage to ordestruction of property in the examination hall or anypart of the college campus or engages in any other actwhich intheopinionoftheofficerondutyamountsto useofunfairmeansormisconductorhasthe	3. In case of students of the college, they shall be expelledfromexaminationhallsandcancellationoftheirperfo rmanceinthatsubjectandallothersubjectsthestudent(s) has (have) already appeared and shall not bepermitted to appear for the remaining examinations of thesubjects ofthatSemester/year. 4. The students also are debarred and forfeit their seats. Incase of outsiders, they will be handed over to the policeandaPolicecaseisregisteredagainstthem.

	tendencytodisruptthеorderlyconductoftheexamination.	
7.	Leaves the exam hall taking away answer script orintentionally tears off the script or any part there ofinsideoroutsidetheexaminationhall.	3. Expulsion from the examination hall and cancellation ofperformance in that subject and all the other subjects thestudenthasalreadyappearedincludingpracticalexaminations and project work and shall not be permittedfortheremainingexaminationsofthesubjectsofthatSemester/year. 4. The student is also debarred for two consecutive semestersfromclassworkandAllUniversityexaminations.Thecontinuationofthecoursebythestudentissubjecttothe academicregulationsinconnection withForfeitureofseat.
8.	Possesses any lethal weapon or firearm intheexaminationhall.	3. Expulsion from the examination hall and cancellation ofthe performance in that subject and all other subjects thestudenthasalreadyappearedincludingpracticalexaminationsandprojectworkandshallnotbepermitted for the remaining examinations of the subjectsofthatSemester/year. 4. Thestudentisalsodebarredandforfeits theseat.Police casewill beregistered.
9.	Ifstudentofthecollege,whoisnotastudentfortheparticularexaminationoranypersonnotconnectedwiththecollegeindulgesinanymalpracticeorimproperconductmentionedinclause6to8.	Expulsion from the examination hall and cancellation of theperformance in that subject and all other subjects the studenthas already appeared including practical examinations andproject work and shall not be permitted for the remainingexaminationsof thesubjectsof thatSemester/year.Thestudentisalsodebarredand forfeitstheseat. Person(s) who do not belong to the college will be handedovertothepoliceand,apolicecaseWillberegisteredagainstthem.
10.	Comesinadrunkencondition totheexaminationhall.	Expulsion from the examination hall and cancellation of theperformance in that subject and all other subjects the studenthasalready appearedforincludingpracticalexaminationsandprojectworkandshallnotbepermittedfortheremaining examinationsofthesubjectsofThatsemester/year.
11.	Copyingdetectedonthebasisofinternalevidence,suchas, duringValuationorduringspecialscrutiny.	Cancellation of the performance in that subject and all othersubjectsthestudenthasappearedforincludingpracticalexaminationsandprojectworkofthatsemester/year

		Examinations.
12.	If any malpractice is detected which is not covered inthe above clauses 1 to 11shallbe reported to thePrincipalforfurtheractiontoawardasuitable Punishment.	

Malpractices identified by squad or special invigilators: Punishment to the students as per theabove guidelines.

41 General

41.1 Whereverthewords“he”, “him”,“his”,occurin theregulations,they include“she”,“her”,“hers”.

41.2 Wherethewords “Subject” or“Subjects”,occurinthese regulations,they alsoimply“Course”or“Courses”.

41.3 Theacademicregulationshould bereadasawholeforthepurposeofinterpretation.

41.4 Incaseofanydoubtorambiguityintheinterpretationoftheaboverules,thedecisionofthe AcademicCouncil isfinal.

41.5 The Institution may change or amend the Academic Regulations, course structure orsyllabi atany time,andthe changes oramendmentsmade shallbe applicable toallstudentswitheffectfromthedatenotifiedbytheInstitution.

ACADEMICREGULATIONSFORB.TECHLATERALENTRYSTUDENTS

Applicablefor thestudentsadmittedintoII-year B. Tech.(LateralEntryScheme)fromtheAcademic Year2023-24.

5.EligibilityforawardofB. Tech.Degree(LES)

The LES candidates shall pursue a course of study for not less than three academic years andnotmorethansix academicyears.

The candidate shall register for 120 credits and secure 120 credits by securing a minimumCGPAof≥5ofB.Tech.IItoIVyearforthe awardofB.Tech.Degree.

Thestudent(s),whofailtofulfilltherequirementfortheawardofthedegreeinsixAcademic years from the year of admission, shall forfeit their seat(s). The attendance regulationsofB.Tech.(Regular)shallbeapplicabletoB.Tech.(LES).

6.PromotionRule

A student shall be promoted from B.Tech., II Year to III Year if he/she gets at least a minimum of 24out of 40credits,up toII-yearII semester, from all the examinations,whetheror notthecandidate takestheexaminations.

A studentshall be promoted from IIIyear to IV yearif he/she gets a minimum of 48out of 80credits, up to III-year II semester, from all the examinations, whether or not the candidate takesthe examinations.

A student shall register and put-up minimum attendance in all 120 credits and earns all 120 credits tobeeligiblefortheawardofB.Tec degree.

A student, who fails toearn 120 credits as indicatedin the course structure within six academicyears,shallforfeithis/heradmissioninB.Tech.Course.

7.AwardofClass

Astudent,whosatisfiesalltherequirementsprescribedforthecompletionoftheB.Tech.program,iseligiblefo rthe awardofthe saiddegree,inanyone ofthe followingfourclasses:

CGPA	ClassAwarded	
≥8.00	FirstClasswithDistinction	From the CGPAsecuredfrom120credits
≥7.00 -<8.00	FirstClass	
≥6.00 -<7.00	SecondClass	
≥5.00 -<6.00	PassClass	

8. AlltheotherregulationsasapplicabletoB.Tech.4-yeardegreecourse(Regular)willholdgoodforB.Tech.(LateralEntryScheme).

Annexure-I

B.TechwithMinorProgram

VJIThas always been emphasizing to orient the students towards the technologies thatshall drive the world in the years to come; the Institution has introduced the Bachelor **ofTechnology in a particular specialization with minor program** *(For eg., B. Tech. inElectronics&CommunicationEngineeringwith Minorin AI&ML)*fromAY.2021-22.

The Bachelor of Technology (B.Tech) with minor programs offered by VJIT focuses on thefundamentalprincipleofEngineering,wherethedevelopmentofcritical&analyticalthinking and the ability to develop a distinctive approach to any given problem statementshallbethe drivingfactorthatfuelsthepedagogicdiscourse.

B.Tech.withMinordegree:

A studentwillbeeligibletogetB.Tech.with MinorDegree,ifhe/shecompletesanadditional18credits.Theseshouldbeacquiredthroughregistered coursesaspertherespective courses offered by the Institute or through MOOCs as equivalent to the coursesofferedbytheInstitute.

ThekeyfeaturesoftheB.TechwithMinorprogrambeing:

- The student can identify **only one area** of specialization along with his/her basicengineeringdegree.
- The no. of courses for Minor program is limited to 2 in a semester along with normalcourses.
- InadditiontothetraditionalB.Tech.programwhichisa4-Year(8Semesterprogram)offering160coursecredits,additional **18Credits**(minimum) tobecompleted as part of the **B.Tech with Minor program** betweenthe**5th**and**8th**semesterwithinthesameperiodof4-YearB.Tech.program.
- To successfully complete the **B.Tech with Minor program** the student shall need toclear the examinations for the additional 18 Credits. These credits can be acquiredadoptingadvancedsubjectsintheofferedspecialization/interdisciplinarystudies, etc.

The followingaretherecommendedareasforMinorprograms:

S.No.	MinorProgram	Eligiblebranchofstudents	@ OfferingDepartment	AwardofDegree
1	Construction Engineering& Management	Allbranches,exceptB.Tech.CivilEngg.	CivilEngg.	"B. Tech. in branch namewithMinorinConstruction Engineering&Management
2	Robotics	Allbranches,exceptB.Tech.Mech.Engg	Mech.Engg.	"B. Tech. in branchname withMinorinRobotics
3	ElectricVehicles	Allbranches,exceptB.Tech.EEE	EEE	"B. Tech. in branchname withMinorinElectricVehicles
4	SustainableEnergy	Allbranches,exceptB.Tech.EEE	EEE	"B. Tech. in branch namewithMinorinSustainable Energy
5	IoT	Allbranches,exceptB.Tech. ECE	ECE	"B. Tech. in branchname withMinorinIOT"
6	CSE	All branches, except B.Tech.CSE	CSE	"B.Tech.inbranchnamewithMinorinCSE
7	IT	Allbranches,exceptB.Tech.IT	IT	"B. Tech. in branchname withMinorinIT
8	AI&ML	Allbranches,exceptB.Tech.AI	AI	"B. Tech. in branchname withMinorinAI&ML
9	Business &InnovationManagement (B&IM)	All branches ofB.Tech.	MBA	"B.Tech.inbranchnamewithMinorinB&IM

Rules&RegulationsforB.Tech.withMinorDegree

12. The duration and all the academic regulations are on par with regular 4-Years B. Tech.program.A studentcompletes/earnsall therequiredcredits of acourse,ifhe/sheregistersforthe courseandobtains a passinggrade.
13. Only Students having earned all the credits at the end of the third semester (i.e., end of2nd Year I-semester) without active backlogs are eligible to register for Minor program, inthe fifthsemesteronly.
14. For B. Tech with Minor,a student needs to earn additional minimum 18 credits (overand above the required 160 credits for B. Tech degree) as per the Minor program coursestructure.
15. Course registration fee per course should be met by the students only. The registrationfeepercreditis Rs.1000/-.
16. After registering for the Minor programme, if a student fails in any registered course andunable to earn all the required 18 credits in a specified duration (twice the duration of thecourse), he/she shall not be awarded Minor degree. However, if the student earns all therequiredcreditsof160forB.Tech.,he/shewillbeawardedonlyB.Techdegreeinthe

concerneddiscipline.Thereisnotransferof creditsfrom Minorprogram coursestoregularB.Tech.degreecourse&viceversa.

17. These18credits(minimum)aretobeearnedfrom:
    - AdditionalCoursesofferedinthespecializationbytheconcerneddepartment.
    - MOOC courses offered by SWAYAM MOOCs as notified/approved by the university(minimum3credits each)fromtimetotime.
    - Anyexpensesincurred fortheMOOCscourseto bemetbythestudentsonly.
18. Online courses registered shall be certified ones with grading/marks/pass. Only Pass-grade/pass-marks/passorabovegrade/marksshallbeconsideredforinclusionofgrades.
19. If the MOOC course is a pass course without any grades, the grade to be assigned as perthe mainregulations.
20. Prior to registration to MOOC courses, formal approval of the courses, by the Universitybased on the organization of the programme, syllabus coverage, detailed duration of theprogramme,natureofevaluationetc.isneeded.
21. Theadditionalcourses(forminimumof 18credits)maybefrom thedepartmentsoffering courses/subjects for the Minor degree. These subjects can be considered asadvancedcoursesinthatspecialization/interdisciplinarycoursesetc.
22. However, the choice to opt/ take the Minor program is purely on the choice of thestudents in a particular engineering stream. Only top 50% of the total class in eachspecialization, based on their overall percentage of marks without active backlogs up to3rdsemester (II-year I Semester), are eligible to register for Minor program courses/subjects.

Requirement fortheAward ofB.Tech withMinorDegree:

f) A student may opt for B.Tech with Minor degree if she/he has no active backlogs till3rdsemester.

g) For B. Tech with Minor, a student needs to earn additional 18 credits (minimum overand above the required 160 credits for B. Tech degree) as per his/her registered Minorprogram.

h) Student should take permission of registration for the B.Tech with Minor programfrom Head of the department & faculty/course in-charge before commencement of 3rdYearISemesteror5thSemester.

i) To successfully complete the B.Tech with Minor program the student shall need toclear theexaminationsfortheadditional 18Credits.Theexaminationsshallbeconductedas pertheAICTEas wellas Universityguidelines.

j) The student shall be given a choice of withdrawing all the courses registered and/orcredits earned for Minor courses/degree; and in that case the student will be awardedonly B. Tech. degreein the concernedspecialization on earning the required creditsof160inaspecifiedduration.

Thefollowingarethecoursestructure ofB.TechMinorprogramsofferedbyvariousdepartments:

CourseStructureofB.Tech MinorProgramsofferedbyVariousDepartments

Department ofCivilEngineering

B.TECHMINORINCONSTRUCTIONENGINEERING& MANAGEMENT

S.No.	Year/Semester	Course	L	T	P	Credits
1	III-I	PrinciplesofSurveying/ **MOOCS**	3	0	0	3
2	III-I	SurveyingLab	0	0	3	1.5
3	III-II	Essentialsofbuildingplanning /**MOOCS**	3	0	0	3
4	III-II	ComputeraidedBuildingplanningLab	0	0	3	1.5
5	IV-I	AI applicationsinconstructionpractices	3	0	0	3
6	IV-I	ConstructionManagement/**MOOCS**	3	0	0	3
7	IV-II	MiniProject	0	0	6	3
TotalCredits						**18**

DepartmentofMechanicalEngineeringB

.TECHMINOR IN ROBOTICS

S.No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	PrinciplesofRobotics	3	0	0	3
2		SCILabforRoboticsLab	0	0	3	1.5
3	III-II	Microcontrollersfor Robotics	3	0	0	3
4	IV-I	Advanced Robotics(or) SWAYAMcourseon IntroductiontoRobotics	4	0	0	4
5		RoboticSimulationLab	0	0	3	1.5
6	IV-II	Implementation ofRoboticSystems	3	0	0	3
7		MiniProject	0	0	4	2
TotalCredits						**18**

DepartmentofElectrical&ElectronicsEngineeringB.TECHMI NOR INSUSTAINABLEENERGY

S.No.	Year/ Semester	CourseTitle	L	T	P	Credits
1.	III-I	EnergyanditsResources	4	0	0	4
2.	III-II	ClimateChangeUnderstandingand Observations	3	0	0	3
3.	III-II	EnergyanditsResourcesLab	0	0	3	1.5
4.	IV-I	EnergyStorageforRenewable	3	0	0	3
5.	IV-II	**Electives** 4. ElectronicsforRenewable 5. SolarEnergyTechnologiesandS ystemDesign 6. SolarEnergySystem InstallationsandMaintenance	3	0	0	3
6.	IV-II	EnergySystems Lab	0	0	3	1.5
7.	IV-II	Internship/MiniProject	0	0	4	2
TotalCredits						**18**

B.TECHMINORINELECTRICVEHICLES

S.No.	Year/S emester	CourseTitle	L	T	P	Credits
1.	III-I	ElectricVehicleandEnergySystems	4	0	0	4
2.	III-II	PowerElectronicsandControlof ElectricMachines	3	0	0	3
3.	III-II	SimulationLab	0	0	3	1.5
4.	IV-I	AutomotiveTransmissionand Communication	3	0	0	3
5.	IV-II	**Electives** 4. ElectricVehicleDynamicsandT esting 5. BatteryChargingTechnologyforEVs 6. Electric Vehicle: Safety andRegulationsandFutureofE Vs	3	0	0	3
6.	IV-II	ElectricMobilityLab	0	0	3	1.5
7.	IV-II	Internship/MiniProject	0	0	4	2
TotalCredits						**18**

DepartmentofElectronics&CommunicationengineeringB.T

ECHMINOR ININTERNETOFTHINGS

S.No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	Embedded Sensors and IOTArchitectures	4	0	0	4
2	III-I	EssentialsofPythonProgrammingLaboratory	0	0	3	1.5
3	III-II	IOTCommunicationProtocols	3	0	0	3
4	III-II	SmartTechnologies	3	0	0	3
5	IV-I	Fog&EdgeComputingfor IoT	3	0	0	3
6	IV-I	IoTAutomationwithRaspberry-PILaboratory	0	0	3	1.5
7	IV-II	MiniProject	0	0	4	2
TotalCredits						**18**

DepartmentofComputerScienceandEngineeringB.TECHMI

NORINCOMPUTERSCIENCEANDENGINEERING

S. No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	Computer SystemArchitecture	3	0	0	3
2	III-I	Data Structures	3	0	0	3
3	III-I	DataStructuresLab	0	0	3	1.5
4	III-II	DataWarehousingandData Mining	3	0	0	3
5	III-II	DataWarehousingandData MiningLab	0	0	3	1.5
6	IV-I	ArtificialIntelligence LinuxProgramming SoftwareTestingMethodologies E-Commerce	3	0	0	3
7	IV-II	MiniProject	0	0	6	3
TotalCredits						**18**

DepartmentofInformationTechnologyB.TECHMI

NORININFORMATIONTECHNOLOGY

S. No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	FundamentalsofAlgorithms	3	0	0	3
2	III-I	AlgorithmsLab	0	0	3	1.5
3	III-II	FoundationsofCloudComputing	3	0	0	3
4	IV-I	FundamentalsofDatabaseManagementSystems	3	0	0	3
5	IV-I	FundamentalsofDatabaseManagementSystemsLab	0	0	3	1.5
6	IV-II	PrinciplesofArtificialIntelligenceBigData Analytics Internet of ThingsBlockchainTechnologies(or) SwayamCourseonBigDataComputing	3	0	0	3
7	IV-II	MiniProject				3
TotalCredits						**18**

DepartmentofArtificialIntelligence

B.TECHMINORINARTIFICIALINTELLIGENCE&MACHINELEARNING

S.No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	FoundationsofArtificialIntelligence	3	0	0	3
2	III-I	PythonProgrammingLab	0	1	3	2.5
3	III-II	FoundationsofMachineLearning	3	0	0	3
4	III-II	FoundationsofMachineLearning Lab	0	0	3	1.5
5	IV-I	BasicsofDeep Learning	2	0	0	2
6	IV-I	BasicsofDeepLearningLab	0	0	2	1
7	IV-II	**Electives:** 5. PrinciplesofNaturalLanguageProcessing 6. IntroductiontoComputer Vision 7. SoftComputing 8. Introduction to Artificial NeuralNetworks	3	0	0	3
8	IV-II	MiniProject	0	0	0	2
TotalCredits						**18**

DepartmentofManagementStudies

B.TECHMINORINBUSINESS&INNOVATIONMANAGEMENT

S. No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III -I	FoundationsofManagement	4	0	0	4
2	III-II	Innovation &DesignThinking	3	0	0	3
3	III-II	DesignthinkingandIdeationLaboratory	0	0	3	1.5
4	IV-I	BusinessIdeationBusinessModels	3	0	0	3
5	IV-I	BusinessPlanDevelopment	0	0	3	1.5
6	IV-II	**AnyONE ofthefollowingsubjects:** 5. Projectmanagement 6. MarketResearch 7. LegalAspectsofBusiness 8. TechnologyManagement (if not studied in theregularcourse)	3	0	0	3
7	IV-II	**MiniProject** FieldStudyReport/Feasibility reportonNewventures/Pitfallsofentrepreneurship	0	0	4	2
TotalCredits						**18**

Annexure-II

B.Tech(Honors)

The B. Tech. (Honors) programs are proposed to choose for an area of specialization amongvarious emerging technologies in order tobe a domain expert.A studentwill be eligible toget B. Tech. (Honors) Degree, if he/she completes an additional 20 credits. These should beacquired through registered courses as per the respective courses offered by the University orthroughSWAYAMMOOCs asequivalenttothecoursesofferedbythe Institute.

4. Objectives

Thekeyobjectivesofoffering**B.Tech.(Honors)**programsare:

- To expand thedomainknowledgeoftheundergraduatestudents.
- Toincreaseeducationalandprofessionalskills requiredforpursuinghigherstudies orresearchintheareaofinterest.
- Toacquiremoreknowledgeasperindustryrequirementforbetteremployment.

Thekeyfeaturesofthe**B.Tech.(Honors)**programbeing:

- Thestudentcanidentify**onlyonearea**ofspecializationalongwithhis/herbasicengineeringdegree.
- Theno.ofcoursesregisteredforhonorsislimitedtoTWOinasemesteralongwithnormal courses.
- In contrast toa traditional B. Tech. program which is a 4 Year (8 Semesterprogram) offering 160 course credits, the **B. Tech. (Honors)** program is a 4 Yearprogram(8Semesterprogram)offering180course credits.
- The additional **20 Credits (**Minimum, and maximum 20 credits**)** to be completedaspartofthe **B.Tech.(Honors)** programis to be spaced out betweenthe**5th**and**8th semester.**
- To successfully complete the **B. Tech. (Honors)** program thestudentshall needto clear the examinationsfor the additional 20Credits.These credits can beacquiredoptingadvancedsubjectsintheofferedspecialization/research/interdisciplinarystudies,etc.

5. ProposedSpecializationDetails

As per AICTE guide lines 2021-22, some of the VJIT proposed B. Tech. (Honors) programsare givenbelowineachmajordiscipline:

S.No.	HonorsProgram	Eligiblebranchofstudents	@ OfferingDepartment	AwardofDegree
1.	StructuralEngineering	B.Tech.CivilEngg.	CivilEngg.	"B.Tech.(Honors)inbranchnamewithSpecialization in StructuralEngineering
2.	CAD/CAM	B.Tech.Mech.Engg.	Mech.Engg.	"B.Tech.(Honors)inbranch namewithSpecialization inCAD/CAM
3.	PowerSystems	B. Tech.EEE	EEE	"B.Tech.inbranchnamewith Minor in PowerSystems
4.	ECE	B.Tech.ECE	ECE	"B. Tech. (Honors) inbranch namewithSpecializationinECE
5.	CSE	B. Tech.CSE	CSE	"B.Tech.(Honors)inbranch namewithSpecializationinCSE

6. RulesandRegulationsforB.Tech.(Honors) Degree

13. The duration and all the academic regulations are on par with regular 4-Years B. Tech.program. A student will be awarded B. Tech. (Honors) degree, if he/she completes &earns all the required credits of a course for the registered courses and obtains a passinggrade.
14. The departmentconcerned shall have atleast one M.Tech (Preferably NBA accredited)inthe concernedstream,forB.Tech.(Honors)registration.
15. Only Students having earned all the credits with CGPA of **7or above** at the end of thethird semester (i.e., end of 2nd Year I Sem.) are eligible to register for B.Tech. (Honors),inthefifthsemesteronly.
16. For B. Tech. (Honors), a student needs to earn additional minimum 20 credits (over andabove the required 160 credits forB. Tech degree)relevant to her/his discipline as perthe coursestructure.
17. Course registration fees per course should be met by the students only.Theregistrationfeespercreditis Rs.1000/-.

18. After registering for the B.Tech. (Honors) programme, if a student fails in any registeredcourse and unable to earn all the required 20 credits in a specified duration, he/she willnotbe eligibleforobtainingB.Tech.(Honors)degree.
19. There is NO reduction in total no. of credits offered in the concerned regulations and NOcredittransferfromnormalcourses tohonorscoursesandvice versa.
20. These20creditsaretobeearnedfrom:
    - Additional Courses offered in the same specialization by the concerned department.Course registration fee per course should be met by the students only as per the normsoftheUniversity.
    - CoursesofferedbyNPTEL/SWAYAMMOOCsasnotified/approvedbytheuniversity (minimum 3 credits each) from time to time. The duration of courses shallbeaminimumof12-14weeks.TheassessmentandcertificationoftheNPTEL/SWAYAM MOOCs courses shall be asper the prescribed norms of theNPTELandapprovedbytheInstitute
    - Any expenses incurred for the NPTEL/SWAYAM MOOCs course should be met bythe studentsonly.
21. Online courses registered shall be certified ones with grading or marks or pass/ fail. OnlyPass- grade/ pass-marks/ pass or above grade/marks shall be considered for inclusion ofgrades.
22. If the MOOC course is a pass course without any grades, the grade to be assigned as perthe mainregulations.
23. The additional courses (for minimum of 20 credits) may be from the same department asthe undergraduate major. These subjects can be considered as advanced courses in thatspecialization/research/interdisciplinarycoursesetc.
24. However, the choice to opt/take the Honors program is purely on the choice of thestudents in a particular engineering stream. Only top 30% of the total class in eachspecialization, based on their overall percentage of marks in first attempt (without fail inany subject) up to 3rd semester (II-year I Semester), and are eligible to register for honorsprogramcourses/subjects.

RequirementfortheAwardofB. Tech.(Honors)Degree:

A student enrolled in a B. Tech. program may also graduate with Honors, provided thestudent completes all the additional requirements for Honors, as specified by the regulationsfor the program in which he/she is enrolled. These additional requirements normally shouldinclude:

d) For B. Tech (Honors), a student needs to earn additional 20 credits (minimum, overand above the required 160 credits for B. Tech degree) relevant to the discipline asrecommended by the faculty advisor based on the courses offered in course structureforhonors degree.
e) Studentshouldnothavereceivedany 'F'grade throughout theprogram infirstattempt(withoutfailinanysubject).
f) Transfer of credits will not bepermitted from regular courses to honors courses andviceversa.

4.Registration

8) At the beginning, just before the start of classes, of each semester, a student shallregisterfor the courses he/she wishes to take in thatsemester. A studentshallnormallybeallowedtoregisterforacourseonlyifhe/shehaspassedallthenecessarypre-requisitesforthatcourse.
9) Student should take permission of registration for the B.Tech with Honors programfromHeadofthedepartment&faculty/coursein-chargebeforecommencementof3rdYearISemesteror5th Semester.
10) Registrationiscompulsoryforall students,andisthesoleresponsibility of thestudent and must be completed before the last date of registration with necessarycourse registrationfeepersubject.
11) Nostudentisallowedtoregisterdirectlyandtheregistrationshallbethroughinstitute/ department. The registered students list shall be submitted to the universitybytheconcernedprincipal.
12) The institute/ department shall maintain the record of student registered and pursingthe Honors degree.
13) Theinstitute/departmentshallpreparethetimetablefortheregistered Honorscourseswithoutanyoverlap/clashonothercoursesthestudentregisteredfor.
14) Minimum class strength (i.e., 33% of intake) is required for offering in-class Honorscourse.

Thefollowingarethecoursestructure of B.Tech Honorsprogramsofferedbyvariousdepartments:

CourseStructureofB.TechHonorsProgramsofferedbyVariousDepartments

Department ofCivilEngineering

B.TECHHONORSINSTRUCTURALENGINEERING

S.No	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	AdvancedR.C.Design	3	0	0	3
2	III-I	AdvancedConcreteLab	0	0	3	1.5
3	III-II	StructuralDynamics	3	0	0	3
4	III-II	Computeraidedstructuraldesign Lab	0	0	3	1.5
5	IV-I	ResearchMethodology	3	0	0	3
6	IV-I	TechnicalPaperWriting	2	0	0	2
7	IV-II	Cost managementofEngineering projects/onecourse fromMOOCS	3	0	0	3
8	IV-II	Earthquake ResistantDesignOfBuildings/ onecoursefromMOOCS	3	0	0	3
TotalCredits						**20**

DepartmentofMechanicalEngineeringB

.TECH HONORSIN CAD/ CAM

S.No.	Year/Semester	CourseTitle	L	T	P	Credits
1	III-I	IndustrialRobotics	4	0	0	4
2	III-II	AdditiveManufacturing (or)SWAYA MCourseon Fundamentals of AdditiveManufacturingTechnologies	4	0	0	4
3		RoboticSimulation&3DPrintingLab	0	0	3	1.5
4	IV-I	AdvancedFiniteElementMethod	3	0	0	3
5		TechnicalPaperWriting	0	0	4	2
6	IV-II	AdvancedCAD	4	0	0	4
7		CAD/CAM/CAELab	0	0	3	1.5
TotalCredits						**20**

B.TECH HONORSIN POWERSYSTEMS

S.No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	HonorsElective -1	3	0	0	3
2	III-II	ResearchMethodologies	3	0	0	3
3	III-II	HonorsElective -2	3	0	0	3
4	IV-I	HonorsElective -3	3	0	0	3
5	IV-I	HonorsElective-4	3	0	0	3
6	IV-II	TechnicalPaperWriting	0	0	4	2
7	IV-II	HonorsElective-5	3	0	0	3
TotalCredits						**20**

HonorsElectives(E)	**Pre-Requisites**
HonorsElective -1	
WastetoEnergyConversion	PowerSystemsI
Energyanditsresources	PowerSystemsI
ElectricalSafetyand QualityManagement	PowerSystemsI
HonorsElective -2	
AdvancesinDistributionSystems	PowerSystemsI,PowerSystemsII
IoTApplicationsinElectricalEngineering	BasicElectricalEngineering
EnergyStoragesystems forrenewable	PowerSystemsI
HonorsElective-3	
SmartCities–ManagementofSmartUrban	PowerSystemsI,PowerSystemsII
Grid IntegrationofRenewableEnergy Systems	PowerSystemsI,PowerSystemsII
GridIntegrationofElectricVehicles	PowerSystemsI,PowerSystemsII
HonorsElective -4	
Cyber SecurityofSmartGrids	SmartGridsPlanningandOperation
SCADAandEnergyManagementSystems	PowerSystemsI andPowerSystemsII
DistributedGenerationandMicro Grids	PowerSystemsI andPowerSystemsII
HonorsElective -5	
SmartGridProtection	SmartGridsPlanningandOperation
ElectricalSafetyManagement	BasicElectricalEngineering
HVDCTransmission	PowerElectronics,PowerSystems

B.TECHHONORSINELECTRONICS&COMMUNICATIONENGINEERING

S. No.	Year/ Semester	CourseTitle	L	T	P	Credits
1	III-I	**HonorsElective-1** 1.HighSpeed Electronics 2.Nanoelectronics	3	0	0	3
2	III-II	ResearchMethodologies &Ethics	3	0	0	3
3	III-II	**HonorsElective– 2** 1.WirelessSensorNetworks 2.Error Correcting Codes	3	0	0	3
4	IV-I	**HonorsElective– 3** 1.Mixed SignalProcessing 2.Adaptive SignalProcessing	3	0	0	3
5	IV-I	**HonorsElective– 4** 1.SpeechandAudioSignalProcessing 2.Scientificcomputing	3	0	0	3
6	IV-II	Introductionto IOT	3	0	0	3
7	IV-II	TechnicalPaperWriting	0	0	4	2
TotalCredits						**20**

Department ofComputerScienceandEngineering

B.TECHHONORSIN COMPUTERSCIENCEANDENGINEERING

S.No	Year /Semester	Coursetobechosenfrom/studied	L	T	P	C
1.	III-I	**HonorsElective-1** 4. PrinciplesofProgramming Languages 5. Software TestingMethodologies 6. ComputerGraphics	3	0	0	3
2.	III-II	**ResearchMethodologies**	3	0	0	3
3.	III-II	**Honors Elective-2** 1.Foundations of MachineLearning 2.Information Security3.SoftwareProjectManagement	3	0	0	3
4.	IV-I	**HonorsElective-3** 1.Big Data Analytics2.InternetofThings 3.RProgramming	3	0	0	3
5.	IV-I	**Honors Elective-4** 1.Advanced Databases2.NeuralNetworks andDeepLearning 3.NaturalLanguageProcessing	3	0	0	3
6.	IV-II	**TechnicalPaperwriting**	0	0	0	2
7.	IV-II	**HonorsElective-5** 4. Introduction to DataScience 5. ImageProcessing 6. BlockChainTechnologies or MOOCS	0	0	0	3
TotalCredits						**20**

DEPARTMENT OF CIVIL ENGINEERING

B. TECH I YEAR COURSE STRUCTURE 2022-23

(Civil Engineering)

Semester – I

S. No	Course Code	Course Title	L	T	P	Credits
1	A221001	Mathematics-I(Linear Algebra & Calculus)	3	1	0	4.0
2	A221002	Applied Physics	3	1	0	4.0
3	A221081	Applied Physics Lab	0	0	3	1.5
4	A221501	C-Programming for Engineers	3	0	0	3.0
5	A221581	C-Programming for Engineers Lab	0	0	2	1.0
6	A221003	English for Skill Enhancement	2	0	0	2.0
7	A221082	English Language & Communication Skills Lab	0	0	2	1.0
8	A221101	Elements of Civil Engineering	0	0	2	1.0
9	A221381	Engineering Workshop	0	1	3	2.5
10		Induction Programme				
		Total	11	3	12	20

Semester – II

S. No	Course Code	Course Title	L	T	P	Credits
1	A222005	Mathematics– II (Ordinary Differential Equations & Vector Calculus)	3	1	0	4.0
2	A222006	Engineering Chemistry	3	1	0	4.0
3	A222084	Engineering Chemistry Lab	0	0	2	1.0
4	A222304	Engineering Mechanics	3	0	0	3.0
5	A222102	Building Materials, Construction and Planning	2	0	0	2.0
6	A222303	Engineering Graphics & Modelling	1	0	4	3.0
7	A222583	Python Programming Lab	0	2	2	3.0
		Total	**12**	**4**	**8**	**20**

B. TECH II YEAR COURSE STRUCTURE 2022-23

(II Year I Semester)

S. No	Course Category	Course code	Course Title	L	T	P	Credits
1.	BS	A223009	Probability and Statistics	3	1	0	4
2.	PC	A223103	Surveying & Geomatics	3	0	0	3
3.	PC	A223104	Engineering Geology	3	0	0	3
4.	PC	A223105	Solid Mechanics – I	3	0	0	3
5.	PC	A223106	Fluid Mechanics	3	0	0	3
6.	PC	A223181	Surveying & Geomatics Laboratory	0	0	2	1
7.	PC	A223182	Engineering Geology Laboratory	0	0	2	1
8.	ES	A223183	Computer Aided Drafting Laboratory	0	0	2	1
9.	HSMC	A223012	Professional communications	2	0	0	1
Total				**17**	**1**	**6**	**20**

II Year II Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	ES	A224208	Basic Electrical Engineering	2	0	0	2
2.	PC	A224107	Concrete Technology	3	0	0	3
3.	PC	A224108	Solid Mechanics – II	3	0	0	3
4.	PC	A224109	Structural Analysis	3	0	0	3
5.	ES	A224110	Hydraulics and Hydraulics Machinery	3	0	0	3
6.	PC	A224184	Solid Mechanics Laboratory	0	0	2	1
7.	ES	A224185	Fluid Mechanics and Hydraulic Machinery Laboratory	0	0	2	1
8.	PW	A2241P1	Real-time Research Project	0	0	4	2
9.	ES	A224013	QMLR	0	0	2	1
10	ES	A224287	Basic Electrical Engineering Laboratory	0	0	2	1
Total				**14**	**0**	**12**	**20**

B. TECH III YEAR COURSE STRUCTURE 2022-23

III Year I Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	HSMC	A225015	Business Economics & Financial Analysis	3	0	0	3
2.	PC	A225111	Geotechnical Engineering	3	0	0	3
3.	PC	A225112	Design of Reinforced Concrete Structures (SE-I RCC)	3	0	0	3
4.	PC	A225113	Water Resources Engineering	3	0	0	3
5.	PE	1.A225114 2.A225115 3.A225116	Professional Elective – I 1. Advanced Structural Analysis 2. Green Building Technologies 3. Air Pollution and Control Methods	3	0	0	3
6.	OE		Open Elective - I	3	0	0	3
7.	PC	A225186	Geotechnical Engineering Laboratory	0	0	2	1
8.	HSMC	A225087	Advanced English Communication Skills Laboratory	0	0	2	1
9.	MC	A225016	Environmental Science	2	0	0	0
Total				**20**		**4**	**20**

III Year II Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	PC	A226119	Environmental Engineering	3	0	0	3
2.	PC	A226120	Foundation Engineering	3	0	0	3
3.	PC	A226121	Design of Steel Structures (SE-2 Steel)	3	0	0	3
4.	PE	1. A226122 2. A226123 3. A226124	Professional Elective – II 1. Ground water hydrology 2. Ground Improvement Techniques 3. Finite Element Method	3	0	0	3
5.	OE		Open Elective – II	3	0	0	3
6.	PC	A226187	Environmental Engineering Lab	0	0	2	1
7.	PC	A226391	Computer Aided Design Lab	0	0	2	1
8.	PC	A226188	Concrete Technology & Highway Materials Lab	0	0	2	1
9.	PW	A2261P1	Industry Oriented Mini Project/Internship	0	0	4	2
10	MC	A226019	Gender Sensitization	2	0	0	0
Total				**17**	**0**	**10**	**20**

B. TECH IV YEAR COURSE STRUCTURE 2022-23

IV Year I Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	PC	A227128	Quantity Survey & Valuation	3	0	0	3
2.	PC	A227129	Highway Engineering	3	0	0	3
3.	PE	1. A227130 2. A227131 3. A227132	Professional Elective – III 1. Pre stressed Concrete Design 2. Earthquake Engineering 3. Solid And Hazardous Waste Management	3	0	0	3
4.	PE	1. A227133 2. A227134 3. A227135	Professional Elective – IV 1. Railway & Airport Engineering 2. River Engineering 3. Advanced Structural Design	3	0	0	3
5.	OE		Open Elective – III	3	0	0	3
6.	PW	A2271PS1	Project Stage - I	0	0	6	3
7.	PC	A227189	Computational Laboratory	0	0	4	2
Total				**15**	**0**	**10**	**20**

IV Year II Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	PC	A228139	Rehabilitation & Retrofitting of Structures	3	0	0	3
2.	PC	A228140	Remote Sensing & GIS	3	0	0	3
3.	PC	A228141	Construction Engineering & Management	3	0	0	3
4.	PW	A2281PS2/ A2281TS	Project Stage – II Including Seminar	0	0	22	9+2
Total				**9**	**0**	**22**	**20**

COURSE STRUCTURE FOR B.TECH WITH MINOR PROGRAM

MINOR IN PLANNING & CONSTRUCTION

S. No	Year/ Semester	Course Code	Course Title	L	T	P	C
1.	III-I	A215M101	Principles of Surveying	3	0	0	3
2.	III-I	A215M181	Surveying Lab	0	0	3	1.5
3.	III-II	A216M102	Fundamentals of building planning	3	0	0	3
4.	III-II	A217M182	Computer aided Building planning Lab	0	0	3	1.5
5.	IV-I	A217M103	Civil Engineering materials	3	0	0	3
6.	IV-I	A217M104	Sustainable construction Practices	3	0	0	3
7.	IV-II	A218M105	Construction Management/ MOOCS	3	0	0	3
Total				**15**	**0**	**6**	**18**

COURSE STRUCTURE FOR B.TECH WITH HONORS PROGRAM

Honors in Structural Engineering

S. No	Year/ Semester	Course Code	Course Title	L	T	P	C
1.	III-I	A215M102	Advanced Reinforced concrete Design	3	0	0	3
2.	III-I	A215M182	Advanced Concrete Lab	0	0	3	1.5
3.	III-II	A216M103	Structural Dynamics	3	0	0	3
4.	III-II	A216M183	Computer aided structural design Lab	0	0	3	1.5
5.	IV-I	A217M104	Research Methodology	3	0	0	3
6.	IV-I	A218M105	Cost management of Engineering projects	3	0	0	3
7.	IV-II	A2181TPW	Technical Paper Writing	2	0	0	2
8.	IV-II	A218M106	Earthquake Resistant Design Of Buildings / one course from MOOCS	3	0	0	3
Total				**17**	**0**	**6**	**20**

B. TECH I YEAR COURSE STRUCTURE 2022-23

Semester – I

S. No	Course Code	Course Title	L	T	P	Credits
1	A221001	Mathematics-I(Linear Algebra & Calculus)	3	1	0	4.0
2	A221002	Applied Physics	3	1	0	4.0
3	A221081	Applied Physics Lab	0	0	3	1.5
4	A221501	C-Programming for Engineers	3	0	0	3.0
5	A221581	C-Programming for Engineers Lab	0	0	2	1.0
6	A221003	English for Skill Enhancement	2	0	0	2.0
7	A221082	English Language & Communication Skills Lab	0	0	2	1.0
8	A221101	Elements of Civil Engineering	0	0	2	1.0
9	A221381	Engineering Workshop	0	1	3	2.5
10		Induction Programme				
		Total	11	3	12	20

Semester – II

S. No	Course Code	Course Title	L	T	P	Credits
1	A222005	Mathematics– II (Ordinary Differential Equations & Vector Calculus)	3	1	0	4.0
2	A222006	Engineering Chemistry	3	1	0	4.0
3	A222084	Engineering Chemistry Lab	0	0	2	1.0
4	A222304	Engineering Mechanics	3	0	0	3.0
5	A222102	Building Materials, Construction and Planning	2	0	0	2.0
6	A222303	Engineering Graphics & Modelling	1	0	4	3.0
7	A222583	Python Programming Lab	0	2	2	3.0
		Total	12	4	8	20

MATHEMATICS-I (LINEAR ALGEBRA AND CALCULUS)

Department of Humanities & Sciences				I B.Tech I Semester		
Course Code	Hours/Week		Credits	Marks		
A221001	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of eigen values and eigen vectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Write the matrix representation of system of linear equations and identify the consistency of the system of equations.
2. Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.
3. Analyze the convergence of sequence and series.
4. Discuss the applications of mean value theorems to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions.
5. Examine the extrima of functions of two variables with/ without constraints.

Syllabus

UNIT-I Matrices and Linear System of Equations :

Introduction of Matrices, Rank - Echelon form, Normal form. Solution of Linear Systems – Gauss Elimination and LU Decomposition methods.

UNIT-II: Eigen Values and Eigen Vectors:

Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix- Quadratic forms: Nature, Index and Signature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Sequences & Series:

Basic definitions of Sequences and series, Convergence and divergence, Ratio test, Comparison test, Cauchy's root test, Raabe's test, Integral test, Absolute and conditional convergence.

UNIT-IV: Improper Integrals and Mean Value Theorems:

Improper Integrals: Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Generalized Mean Value theorem (Taylor's and MacLaurin's Series all theorems without proof) – Geometrical interpretation of Mean value theorems.

UNIT-V: Functions of several variables:

Partial Differentiation: Total derivative, Functional dependence, Jacobian Determinant- Maxima and Minima of functions of two variables with constraints and without constraints, Method of Lagrange Multipliers.

Textbooks:

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 36th Edition, 2010
2. Advanced Engineering Mathematics by Jain &Iyengar Narosa Publications.

Reference Books:

1. Calculus and Analytic geometry by G.B. Thomas and R.L. Finney, 9th Edition, Pearson, Reprint, 2002.
2. Advanced Engineering Mathematics by Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
3. Advanced Engineering Mathematics (2nd Edition) Michael D. Greenberg

APPLIED PHYSICS

Department of Humanities & Sciences					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221002	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

B.Tech I Year I Semester

Course Outcomes:

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

1. Understand various optical phenomena of light
2. Apply the basic principles of quantum mechanics to classify solids based on the band theory
3. Elucidate the characteristics of semiconductors and semiconductor devices
4. Apply the knowledge of nanotechnology for societal applications
5. Explain the working principle of lasers and optical fibers

Unit – I Wave Optics

Principle of superposition, coherence. Interference - Interference in thin films by reflection, Newton's rings. Diffraction – Fresnel and Fraunhofer diffraction, Fraunhofer diffraction due to single slit, Plane diffraction grating, Resolving power of grating (qualitative treatment). Polarization – Polarization of light waves, Plane of vibration, Plane of polarization, Double refraction, Nicol's Prism, Applications of polarization.

UNIT-II Introduction to Quantum Physics and Band theory of solids

Introduction to quantum physics: Planck's Law (qualitative treatment), wave-particle duality, de-Broglie hypothesis of matter waves, properties of matter waves, time independent Schrodinger equation, Born interpretation of wave function, particle in one dimensional potential box, Fermi-Dirac distribution.

Classical free electron Theory (Qualitative treatment)- merits and demerits, Bloch theorem, Kronig-Penny model (qualitative treatment), E-k diagram, effective mass of electron, Energy bands in solids, classification of materials into metals, semiconductors and insulators.

UNIT-III Semiconductors and Semiconductor devices

Intrinsic and extrinsic semiconductors- energy band diagram and position of fermi level (qualitative treatment).

Direct and indirect band-gap semiconductors, Formation of PN junction, energy level diagram of PN junction, I-V characteristics of PN junction diode; construction, working and characteristics of Photo diode, solar cell and light emitting diode, Hall effect and its applications

UNIT-IV Nanotechnology

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods-top-down fabrication: Ball milling, physical vapor deposition (PVD), chemical vapor deposition (CVD), characterization techniques – basic principles of XRD, SEM, TEM; applications of nanomaterials.

UNIT-V Lasers and Fiber Optics

Introduction to interaction of radiation with matter: Absorption, spontaneous emission and stimulated emission, Einstein coefficients and their relations, characteristics of a laser, population inversion, important components of a laser: active medium, pumping source, optical resonator. Construction and working of Ruby laser, He-Ne laser and semiconductor laser, applications of lasers.

Introduction to optical fibers, total internal reflection, construction of optical fiber, acceptance angle and numerical aperture, step and graded index fibers, block diagram of optical fiber communication system, applications of optical fibers.

Text books:

1. A Text book of Engineering Physics by P K Palanisamy: Scietech publication.
2. Engineering Physics by V Rajendran, McGraw Hill Education.

Reference books:

1. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd dition,2022.
2. Essentials of Nanoscience & Nanotechnology by Narsimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.
3. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S. Chand Publications.

APPLIED PHYSICS LAB

Department of Humanities & Sciences					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221081	L	T	P	C	CIE	SEE	Total
	0	0	3	1.5	40	60	100

B. Tech I Year I Semester

Course Outcomes:

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

1. Apply optical phenomena to characterize optical sources and components.
2. Characterize semiconductors and semiconductor devices.
3. Study transient response of RC circuit and resonance mechanisms in mechanical and electrical systems.
4. Collect data and evaluate the outcomes of an experiment quantitatively and qualitatively.
5. Carry out experimental data analysis.

LIST OF EXPERIMENTS

1. Newton's rings: Determination of the radius of curvature of a given plano-convex lens by forming Newton's rings.
2. Diffraction grating: Determination of wavelength of a given monochromatic source using a plane diffraction grating.
3. Dispersive power: Determination of dispersive power of given prism.
4. Single Slit Diffraction using Laser- Determination of wavelength of given Laser.
5. Energy gap of P-N junction diode: Determination of the energy gap of a semiconductor diode.
6. Light emitting diode: Study of V-I and P-I characteristics of a given light emitting diode.
7. Photo diode: Study of V-I characteristics of photo diode at different intensities.
8. Solar cell: Study of V-I characteristics of solar cell.
9. LCR Circuit: Determination of the resonance frequency of forced electrical oscillator in series and parallel.
10. RC- Circuit: Determination of the time constant of RC-circuit.
11. Optical fiber: a) Determination of the acceptance angle and numerical aperture of optical fiber.
    b) Estimation of attenuation in optical fiber
12. Method of least squares-Torsional pendulum.

Note: Any 10 experiments are to be performed.

Reference books:

1. Engineering Physics Theory and Practical, C. K. Pandey, A. K. Katiyar.
2. Engineering Physics Lab Manual, C. V. Madhusudan Rao.

C-PROGRAMMING FOR ENGINEERS

Department of Humanities & Sciences				I B.Tech I Semester		
Course Code	Hours/Week		Credits	Marks		
A221501	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

B.Tech. I Year I Semester

Course Outcomes:

At the end of this course, the student would be able to

1. Design Algorithms and Flowcharts for real world applications.
2. Know various operators and decision statements for Program development.
3 Design programs involving iteration statements and code reusability using Functions.
4. Develop programs using arrays and identify various string handling functions.
5. Analyze various searching and sorting techniques.

UNIT - I:

Introduction: Introduction to Computers, Number Systems & Conversions, Algorithms, Flowcharts.
Overview of C Language: Introduction, Salient Features of C Language, Structure of a "C" Program.

C Language Preliminaries: Keywords and Identifiers, Constants, Variables, Data Types, and Input / Output Statements with suitable illustrative "C" Programs.

UNIT - II:

Operators: Assignment Operators, Relational and Logical Operators, Increment and Decrement Operators, Bitwise Operators, Ternary Operator, Type Conversion, Precedence and Associatively with suitable illustrative "C" Programs.
Conditional/Decision Statements: if, if-else, Nested if-else, else-if ladder, and Switch-Statement with suitable illustrative "C" Programs.

UNIT - III:

Loop Control Statements: while, do-while and for with suitable illustrative "C" Programs, break, continue.
Pointers: Defining pointers, increment & decrement operations, Pointer to Pointers.
Functions: Introduction to Functions, benefits of functions, types of functions, Function calls, return Statement, Parameter Passing mechanism: Call-by-Value, Call-by-reference Recursion, Storage Classes.

UNIT - IV:

Arrays: Introduction to Arrays, One-Dimensional Arrays, Two-Dimensional Arrays, Arrays and Functions, Pointers and Arrays.
Strings: Introduction to Strings, String I/O, String Manipulation Functions (strlen( ), strcmp( ), strcat( ),strcpy( ) , strrev( ), toupper(), tolower()).

UNIT - V:

Structures: Definition and Initialization of Structures, Accessing structure members, Unions, typedef.
Searching and Sorting: Linear Search, Binary Search, Bubble Sort, Insertion Sort.

Data Structures: Introduction, Stacks, Queues.

TEXT BOOKS:

1. B.A.Forouzon and R.F. Gilberg, “COMPUTER SCIENCE: A Structured Programming Approach Using C”, Third edition, CENGAGE Learning, 2016.
2. Ashok N. Kamthane, “C and Data Structures”, Pearson Education. 2010.

REFERENCE BOOKS:

1.M.T.Somashekara, “Problem Solving Using C”, PHI, 2nd Edition 2009.
2. A.K.Sharma, Computer Fundamentals and Programming in C, 2nd Edition, University Press .
3. PradipDey and Manas Ghosh, "Programming in C 2/e", Oxford University Press, 2nd Edition 2011.
4. Rajaraman V., "The Fundamentals of Computers", 4th Edition,Prentice Hall of India, 2006.
5. R S Bichker, "Programming in C", University Press, 2012.

C-PROGRAMMING FOR ENGINEERS LAB

Department of Humanities & Sciences				I B.Tech I Semester		
Course Code	Hours/Week		Credits	Marks		
A221581	L	T	P	C	CIE	SEE	Total
	0	0	2	1.0	40	60	100

B.Tech. I Year I Semester

Course Outcomes:

At the end of this course, the student would be able to
1. Apply the specification of syntax rules for numerical constants, variables and data types.
2. Know the usage of various operators and design programs on decision Statements.
3. Design programs on loop control statements, pointers and code reusability using functions.
4. Develop programs on array and strings.
5. Implement programs on structures and various searching and sorting techniques.

Week 1

Ubuntu and Linux Commands.

Week 2

Designing of flowcharts and algorithms
1. Areas of Polygons.
2. Calculation of Simple and Compound Interest.
3. Swapping of Two numbers with and without temporary variable.
4. Checking whether a number is even or odd.
5. Sum of first ‘n’ natural numbers.
6. Checking a number whether it is divisible by any given number.
7. Evaluation of mathematical expressions.
8. Programs using scanf( ) and printf( ) statements.
9. Program to find the roots of quadratic equation.

Week 3

Programs on operators.(min 9 programs)
Programs on precedence and Associativity & Type conversions.
Programs on Conditional Statements or Decision Statements.(12)

Week 4,5,6

Programs on Loop Control Statements.(12)
Programs on Pointers, pointer arithmetic, pointer to pointer (6).
Programs on Functions, Recursion& Storage classes.(8)

Week 7,8

Programs on One Dimensional Arrays. (3)
Programs on Two Dimensional Arrays. (2)
Programs on Arrays and Functions, Pointer to Array.
Programs on Strings with string built-in or manipulation Functions.(8)

Week 9,10,11

Programs on Accessing Structures.(4)
Programs on Unions, typedef(4)
Implementation of Linear Search and Binary Search.
Implementation of Bubble Sort and Insertion Sort

ENGLISH FOR SKILL ENHANCEMENT

Department of Humanities & Sciences					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221003	L	T	P	C	CIE	SEE	Total
	2	0	0	2	40	60	100

B. Tech I Year I Semester

Course Objectives:

This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes:

Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for oral and writtencommunication.
3. Demonstrate understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages through effective reading strategies.
5. Construct paragraphs, letters, essays, abstracts, précis and reports in various contexts thereby improving proficiency in writing modules of English.

UNIT - I

Chapter entitled '***Toasted English***' **by R.K.Narayan** from ***"English: Language, Context and Culture"*** published by Orient Black Swan, Hyderabad.

Vocabulary: The Concept of Word Formation - The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance - Techniques for Effective Reading.

Writing: Sentence Structures - Use of Phrases and Clauses in Sentences - Importance of Proper Punctuation - Techniques for Writing precisely – Paragraph Writing -Types, Structures and Features of a Paragraph - Creating Coherence - Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture"*** ***published*** by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-Verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing - Defining/Describing People, Objects, Places and Events – Classifying - Providing Examples or Evidence.

UNIT - III

Chapter entitled **'Lessons from Online Learning' by F. Haider Alvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter - Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion – Précis Writing.

UNIT - V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (*Covering all the other aspects of grammar which were not covered in the previous units*)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports - Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

TEXTBOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
3. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
4. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

Department of Humanities & Sciences					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221082	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

B. Tech I Year I Semester

Course Objectives:

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation ofEnglish by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize the impact of dialects.
5. To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes:

Students will be able to:

1. Reproduce speech sounds and improve language
2. Develop accent and pronunciation in various situations
3. Understand variants in pronunciation by differentiating between British and American accents
4. Identify the diverse purposes of listening and speaking
5. Exhibit critical thinking, problem-solving and decision-making skills through Group Discussions

Exercise I

CALL Lab:

Understand: Listening Skill- its importance-Purpose-Process-Types-Barriers-Effective Listening.

Practice: Introduction to Phonetics- Speech Sounds- Vowels and Consonants- Minimal Pairs - Consonant Clusters - Past Tense Marker and Plural Marker - *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language - Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave Introducing Oneself and Others.

Exercise II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress patternin sentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise III

CALL Lab:

Understand: Errors in Pronunciation-Neutralizing Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation - *Testing Exercises*

ICS Lab:

Understand: Descriptions – Narrations - Giving Directions and Guidelines – Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thankingand Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - *Testing Exercises*

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication - Presentation Skills.

Practice: Making a Short Speech – Extempore - Making a Presentation.

Exercise V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab:

Understand: Group Discussion

Practice: Group Discussion

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* CambridgeUniversity Press
3. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.*Orient Black Swan Pvt. Ltd.

ELEMENTS OF CIVIL ENGINEERING

Department of Humanities & Sciences					I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A221101	L	T	P	C	CIE	SEE	Total
	0	0	2	1	50	-	50

B.Tech. I Year I Semester

Course Objectives:

1. To offer a discussion on various branches of civil Engineering
2. To confer the Role of civil Engineers in nation Building
3. To provide practical knowledge about physical properties of construction materials

Course Outcomes:

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

1. Identify the various rocks, minerals depending on geological classifications
2. Identify Bricks and tiles suitable for Construction Practices
3. Understand soils classifications and its strength Parameters
4. Evaluate the soils and its suitability for construction
5. Evaluate the properties of cement, fine and coarse aggregates and determine its suitability for construction.

LIST OF EXPERIMENTS

Course Content

1. **Introduction :** Overview of Civil Engineering Systems: Introduction to structural engineering, geotechnical engineering, Construction technology, Hydraulics, water resources and irrigation engineering transportation engineering, environmental and sanitary engineering, GIS, earthquake engineering. Role of civil engineers in the development of the nation.
2. **Identification of Minerals & Rocks** – Silica Group, Feldspar Group; Igneous Petrology, Sedimentary Petrology, Metamorphic Petrology.
3. **Tests on Bricks :** compressive strength, water absorption, efflorescence, dimension and warpage
4. **Tests on soils:** Grain size distribution Analysis, Direct shear test
5. **Tests on Cement**
   a. Physical properties on Cement
   b. Fineness test & Normal Consistency test.
   c. Specific gravity test.
6. **Tests on Fine Aggregates**
   a. Specific Gravity test.

7. **Tests on Coarse Aggregate**
    a. Specific Gravity test.
8. **Tests on Concrete:** Compressive strength of given concrete cube
9. **Building Simulation techniques:** Tools, VR, Augmented reality and Mixed reality

TEXT BOOKS/IS Codes:

1. Elements of Civil Engineering by S. S. Bhavikatti Edtn 1, 2009
2. IS 269:2015 – Specification for Cement
3. IS 3495-1976- Specifications of Burnt Bricks
4. *IS-2720-Part 4-1985: Methods of test of soils, Grain Size analysis*
5. IS-2720-PART-13-1986: Direct Shear test
6. IS 383 :1993 “Specification for Coarse and Fine Aggregates from Natural Sources forConcrete”.

ENGINEERING WORKSHOP

Department of Humanities & Sciences				I B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks	
A221381	L	T	P	C	CIE	SEE	Total
	0	1	3	2.5	40	60	100

B. Tech. I Year I Semester

Course Outcomes:

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

1. Understanding the tools and methods of using to fabricate engineering Components.
2. Applying the measuring techniques to verify the dimensional accuracy.
3. Evaluating various methods and trades of workshop in the component building.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry – T-Lap Joint, Dovetail Joint & Tenon Joint.
2. Fitting – V-Fit, Step Cutting & Flat Filling.
3. Tin-Smithy – Open Scoop, Rectangular Tray & Conical Funnel.
4. Foundry – Preparation of Green Sand Mould using Single Piece and Split Pattern.
5. Welding Practice – Arc Welding – Lap Joint & Butt Joint.
6. House-wiring – Parallel Connection, Series Connection & Two-way Switch.

2.TRADES FOR DEMONSTRATION & EXPOSURE

Plumbing, Machine Shop, Power tools in construction and Wood Working

TEXT BOOKS:

1. Manufacturing Engineering and Technology, Kalpakjian S. and Steven S. Schmid, 4th edition, Pearson Education India Edition, 2002.
2. Elements of Workshop Technology, Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

MATHEMATICS II (ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS)

Department of Humanities & Sciences					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222005	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

B.Tech I Year II Semester
Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

To learn

- Methods of solving the differential equations of first and higher order.
- Concept, properties of Laplace transforms
- Solving ordinary differential equations using Laplace transforms techniques.
- The physical quantities involved in engineering field related to vector valued functions

The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes:

After learning the contents of this course the students must be able to:

1. Classify the various types of differential equations of first order and first degree and apply the concepts of differential equations to the real-world problems.
2. Solve higher order differential equations and apply the concepts of differential equations to the real-world problems.
3. Find the Laplace Transform of various functions and apply to find the solutions of differential equations.
4. Evaluate the multiple integrals and identify the vector differential operators physically in engineering problems.
5. Evaluate the line, surface and volume integrals and converting them from one to another by using vector integral theorems.

UNIT-I:

First order Ordinary Differential Equations and their Applications:

Introduction to ODE, Exact, Linear and Bernoulli, Applications of ODE: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-II:

Higher Order Linear Differential Equations:

Linear differential equations of second and higher order with constant coefficients, RHS term of the type f(X) =

$e^{ax}, \sin ax, \cos ax$ *and* $x^k, e^{ax}V(x), x^kV(x)$. Method of variation of parameters, Equations reducible to Linear ODE with constant coefficients: Cauchy-Euler Equation and Legendre's Equations.

Applications: Electric Circuits

UNIT-III:

Laplace transforms:

Laplace transform of standard functions – Inverse transform – first shifting Theorem, transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms – Application of Laplace transforms to ordinary differential equations.

UNIT-IV:

Multiple Integrals & Vector Differentiation:

Multiple integrals - double and triple integrals – change of order of integration (Only Cartesian form)- change of variables (Cartesian to Polar for double integral, Cartesian to Spherical for triple integral). Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT-V:

Vector Integration:

Line integral, work done, Surface and Volume integrals. Vector integrals theorems: Green's, Stoke's and Gauss Divergence Theorems (Only Statements & their Verifications).

Textbooks:

1. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 36th Edition, 2010
2. Advanced Engineering Mathematics by Jain &Iyengar, Narosa Publications.

Reference Books:

1. Calculus and Analytic geometry by G.B. Thomas and R.L. Finney, 9th Edition, Pearson, Reprint, 2002.
2. Advanced Engineering Mathematics by Erwin Kreyszig, 9th Edition, John Wiley & Sons, 2006.
3. Advanced Engineering Mathematics (2nd Edition) by Michael D. Greenberg

ENGINEERING CHEMISTRY

Department of Humanities & Sciences					I B.Tech II Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A222006	**L**	**T**	**P**	**C**	CIE	SEE	Total
	3	**1**	**0**	**4**	**40**	**60**	**100**

B.Tech I Year II Semester

Course Objectives :

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion - it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

The students will able to

1. understand the basic properties of water and its usage in domestic and industrial purposes.
2. acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
3. learn the fundamentals and general properties of polymers and other engineering materials.
4. acquire knowledge of various energy sources.
5. apply the knowledge of engineering materials in daily life.

UNIT - I: Water and its treatment: (10)

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F^- ion by ion- selective electrode method.

Boiler Troubles - Introduction. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange process. Desalination of Brackish water - Reverse osmosis.

UNIT – II Battery Chemistry & Corrosion: (11)

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of Zn-air and Lithium-ion battery. Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting

corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode & impressed current methods and Electroless plating.

UNIT - III: Polymeric materials: (9)

Definition – Classification of polymers with examples – Types of polymerizations – addition and condensation polymerization with examples – Nylon 6:6, Terylene **Plastics:** Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC, Bakelite and Teflon.

Rubbers: Natural rubber and its vulcanization.

Synthetic Rubbers- Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages – Poly lactic acid and poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources: (9)

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula, Numerical problems.

Classification- Solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Trans esterification and advantages.

UNIT - V: Engineering Materials: (9)

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermo response materials- Poly acryl amides and Poly vinyl amides

Lubricants: Classification of lubricants with examples-characteristics of a good lubricant - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpat rai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

ENGINEERING CHEMISTRY LABORATORY

Department of Humanities & Sciences					I B.Tech II Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A222084	**L**	**T**	**P**	**C**	CIE	SEE	Total
	0	**0**	**2**	**1**	**40**	**60**	**100**

B.Tech I Year II Semester

Course Objectives:

The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness and chloride content of water to check its suitability for drinking purpose.
2. To perform estimation of acids and bases using conductometry, potentiometry and pH metry methods.
3. To prepare polymers such as Thiokol rubber and Nylon-6 in the laboratory.
4. Skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

Course Outcomes:

The experiments will make the student gain skills on:

1. Determination of parameters like hardness and Chloride content of water.
2. Determination of rate of corrosion of mild steel in various conditions.
3. To perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
4. To prepare polymers like Thiokol rubber and Nylon-6.
5. Estimation of Saponification value, Viscosity and Surface tension of lubricant oils.

Choice of 8-10 Experiments from the following:

1. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.
2. **Corrosion:** Determination of rate of corrosion of mild steel in various conditions.

3. **Conductometry:**
   a. **1.**Estimation of the concentration of an acid by Conductometry.
   b. **2.**Estimation of the concentration of Mixture of acids by conductometry
4. **Potentiometry:**
   a. Estimation of the Concentration of an acid by potentiometry
   b. Estimation of the amount of Fe^{+2} by Potentiometry
5. **pH Metry:** Determination of an acid concentration using pH meter.
6. **Argentometry:** Estimation of Chloride content of water by argentometry
7. **Preparations:**
   a. Preparation of Thiokol rubber.
   b. Preparation Nylon – 6.

I. Lubricants:

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.
3. Estimation of Surface tension of lubricant oil using Stalagmometer.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publication

ENGINEERING MECHANICS

Department of Humanities & Sciences					I B.Tech II Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A222304	**L**	**T**	**P**	**C**	CIE	SEE	Total
	3	**0**	**0**	**3**	**40**	**60**	**100**

B.Tech I Year II Semester

Course Outcomes:

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

1. Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
2. Solve problem of bodies subjected to friction.
3. Find the location of centroid and centre of gravity of the composite sections.
4. Compute moment of inertia of various sections
5. Analyze the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.

UNIT- I

INTRODUCTION TO ENGINEERING MECHANICS - Force Systems: Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space –Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams.

UNIT- II

FRICTION: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack.

UNIT- III

CENTROID AND CENTRE OF GRAVITY: Centroid of Lines, Areas and Volumes from first principle, centroid of composite sections; Centre of Gravity and its implications, Theorem of Pappus

UNTI- IV

AREA MOMENT OF INERTIA: Definition, Moment of inertia of plane sections from first principles, Moment of inertia of standard sections and composite sections; Product of Inertia, Parallel Axis Theorem, Perpendicular Axis Theorem.

MASS MOMENT OF INERTIA: Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.

UNIT- V

REVIEW OF PARTICLE DYNAMICS: Rectilinear motion, Plane curvilinear motion, Work-kinetic energy, power, Impulse-momentum.

KINETICS OF RIGID BODIES: Basic terms, general principles in dynamics, Types of motion, centre of rotation in plane motion; D' Alembert's principle and its applications in plane motion and connected bodies; Kinetics of rigid body rotation.

TEXT BOOKS:

1. Shames and Rao, Engineering Mechanics, Pearson Education
2. Reddy Vijay Kumar K. and J. Suresh Kumar, Singer's Engineering Mechanics –Statics & Dynamics

REFERENCE BOOKS:

1. Beer F.P & Johnston E.R Jr., Vector Mechanics for Engineers – Statics and Dynamics, Mc Graw Hill.
2. Hibbeler R.C, Engineering Mechanics, Pearson.
3. Khurmi R.S, Khurmi N., Engineering Mechanics, S. Chand.
4. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University

BUILDING MATERIALS, CONSTRUCTION AND PLANNING

Department of Humanities & Sciences				I B.Tech II Semester		
Course Code	Hours/Week		Credits	Marks		
A222102	L	T	P	C	CIE	SEE	Total
	2	0	0	2	40	60	100

B.Tech I Year II Semester

Course Objectives:

1. List the construction material.
2. Explain different construction techniques
3. Understand the building bye-laws
4. Highlight the smart building materials

Course Outcomes:

After the completion of the course student should be able to

1. Understand the different construction material.
2. Understand the different component parts of building and their construction practices and techniques
3. Understand the functional requirements to be considered for design construction of building
4. Identify the factors to be considered in planning and construction of buildings
5. Plan a building based on the factors and principles of planning

UNIT- I:

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing.

Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics.
Timber, Aluminum, Glass, Paints and Plastics: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fiber– reinforced glass bricks, steel & aluminum, Plastics.

UNIT- II:

Cement & Admixtures: Ingredients of cement – manufacture – Chemical composition – Hydration -field & lab tests.
Admixtures – Mineral & Chemical Admixtures – uses.

UNIT – III:

Building Components: Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed; foundations – types; Damp Proof Course; Joinery – doors – windows – materials
– types.

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire Hazards – Classification of fire- resistant materials and constructions

UNIT- IV:

Mortars, Masonry and Finishing's Mortars: Cement Mortar, Brick masonry – types – bonds; Stonemasonry – types; Composite masonry – Brick-stone composite; Concrete, Reinforced brick.
Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.
Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning

UNIT-V:

Building Planning: Classification of buildings ,functional Planning of buildings: Sustainability and concept of Green building, General aspects to consider for planning, bye-laws and regulations, Selection of site for building construction, Principles of planning, Orientation of building and its relationto outside environment

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.
2. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.

REFERENCE BOOKS:

1. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; NewAge Publications.

ENGINEERING GRAPHICS & MODELING

Department of Humanities & Sciences					I B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A222303	L	T	P	C	CIE	SEE	Total
	1	0	4	3	40	60	100

B.Tech I Year II Semester

Course Outcomes:

1. Comprehend the concepts of engineering drawing and CAD software.
2. Conceptualize and draw the projections of points and straight lines.
3. Visualize and project different views of a planes and solids.
4. Evaluate the surfaces of solids developed for further processing in the engineering applications.
5. Generate isometric and corresponding orthographic views of any given component.

UNIT- I:

Introduction To Engineering Drawing: Principles of engineering graphics and their significance, usage of drawing instruments, conic sections, including the rectangular hyperbola– general method only. Cycloid, Epicycloid, Hypocycloid. Scales – plain & diagonal only.

INTRODUCTION TO CAD: Introduction to CAD software and its importance, standard toolbar/menus and navigation tools used in the software.

UNIT- II:

Principles Of Orthographic Projections: Conventions. Projections of points.

Projections Of Lines: (first angle projection) inclined to both planes (traces and midpoint problem to be excluded).

Implementation Of CAD: Drawing orthographic projections of points and lines using a CAD package.

UNIT – III:

Projections Of The Planes: Projections of regular planes inclined to both the planes.
Projections Of Solids: Projections of regular solids inclined to both the planes (prisms, pyramids, cones and cylinders, Change of potion method only).
Implementation In CAD: Drawing orthographic projection of planes and regular solids using a CAD package.

UNIT- IV:

Sections And Sectional Views of Right Angular Solids: Prism, Cylinder, Pyramid, Cone.
Development Of Surfaces of Right Regular Solids: Prism, Pyramid, Cylinder and Cone.
Implementation In CAD: Drawing sectional views of solids and the development of right regular solids using a CAD package.

UNIT-V:

Principles Of Isometric Projection: Isometric scale, isometric views, conventions, isometric views of lines, planes, simple solids. Conversion of orthographic views to isometric views.
Orthographic Projections: conversion of isometric views to orthographic views.
Implementation In Cad: Drawing isometric views from giving orthographic views and vice-versa using a CAD package.

TEXT BOOKS:

1. Engineering Drawing, Bhatt N.D., Panchal V.M. & Ingle P.R., Charotar Publishing House.

REFERENCE BOOKS:

1. Text book on Engineering Drawing, Narayana, K.L. & P. Kannaiah, Scitech Publishers.
2. Engineering Drawing and Computer Graphics, Shah, M.B. & Rana B.C, Pearson Education.
3. http://docs.autodesk.com/ACDMAC/2013/ENU/PDFs/acdmac_2013_users_guide.pdf

PYTHON PROGRAMMING LAB

Department of Humanities & Sciences					I B.Tech II Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A222583	**L**	**T**	**P**	**C**	CIE	SEE	Total
	0	**2**	**2**	**3**	**40**	**60**	**100**

B. Tech I Year II Semester

Course Outcomes:

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

- Develop the application specific codes using python.
- Understand Strings, Lists, Tuples and Dictionaries in Python
- Implement programs using modular approach, file I/O, Python standard library

Week -1 (Installation & Simple Applications)

1. i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   ii) Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.

Week - 2: (Mathematical Expressions & I/O Operations)

1. i) Write a program to calculate compound interest when principal, rate and number of periods are given.
   ii) Given coordinates (x1, y1), (x2, y2), find the distance between these two points.
2. Read name, address, email and phone number of a person through keyboard and print the details.

Week – 3 (Conditional statements)

1. Write a Program to find the given number is even or odd.
2. Write a program to find the maximum of three numbers (use 'if-elif-else' ladder).

Week – 4 (Loop Statements)

1. Write a program to Print the Fibonacci sequence using while loop.

2. Write a program to Print the below triangle using for loop:

5
4 4
3 3 3
2 2 2 2
1 1 1 1 1

3. Write a program to print all prime numbers in a given interval (using break statement).

Week – 5 (List, Tuple, Dictionary)

1. i) Write a program to illustrate operations of List & Tuple
   ii) Write a program to find common values between two lists.
2. Write a program to perform addition of two matrices.
3. Write a program to read dictionary values from the user and find an element using given key.

Week – 6 (Functions & Modules)

1. Write a function called is_sorted that takes a list as a parameter and return True if the list is sortedin ascending order and False otherwise.
2. Write a function called GCD that takes parameters **a** and **b** and return their greatest common divisor.
3. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.

Week –7(Strings)

1. Write a program to add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
2. Write a program to remove the given word in all the places in a string?
3. Write a function that takes a sentence as an input parameter and replaces the first letter of everyword with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?

Week–8 (Classes & objects)

1. Write a program to add two complex numbers using classes and objects
2. Write a function called draw rectangle that takes a Canvas and a Rectangle as arguments and draw a representation of the Rectangle on the Canvas.

Week– 9 (Inheritance)

1. Write a program to demonstrate the various types of Inheritances.

Week– 10(File Concepts)

1. Write a program to merge two given file contents into a third file.
2. Write a program to Read text from a text file, find the word with most number of occurrences
3. Write a program that reads a file *file1* and displays the number of words, number of vowels, and blank spaces.

Week – 11(Packages)

1. a) Install NumPy package with pip and explore it.
   b) Illustrate 1-D and 2-D vector processing and slicing.
2. Explore matplotlib with plotpy and visualize the data.

TEXT BOOKS:

1. "Python Programming- Using Problem Solving Approach", Reema Thareja, Oxford
2. "Python Programming-Problem Solving, Packages and Libraries", Anurag Gupta, G.P. Biswas, Mc Graw Hill

II year Course Structure
(II Year I Semester)

S. No	Course Code	Course Code	Course Title	L	T	P	Credits
1.	BS	A223009	Probability and Statistics	3	1	0	4
2.	PC	A223103	Surveying & Geomatics	3	0	0	3
3.	PC	A223104	Engineering Geology	3	0	0	3
4.	PC	A223105	Solid Mechanics – I	3	0	0	3
5.	PC	A223106	Fluid Mechanics	3	0	0	3
6.	PC	A223181	Surveying & Geomatics Laboratory	0	0	2	1
7.	PC	A223182	Engineering Geology Laboratory	0	0	2	1
8.	ES	A223183	Computer Aided Drafting Laboratory	0	0	2	1
9.	HSMC	A223012	Professional communications	2	0	0	1
Total				**17**	**1**	**6**	**20**

II Year II Semester

S. No	Course Code	Course Code	Course Title	L	T	P	Credits
1.	ES	A224208	Basic Electrical Engineering	2	0	0	2
2.	PC	A224107	Concrete Technology	3	0	0	3
3.	PC	A224108	Solid Mechanics – II	3	0	0	3
4.	PC	A224109	Structural Analysis	3	0	0	3
5.	ES	A224110	Hydraulics and Hydraulics Machinery	3	0	0	3
6.	PC	A224184	Solid Mechanics Laboratory	0	0	2	1
7.	ES	A224185	Fluid Mechanics and Hydraulic Machinery Laboratory	0	0	2	1
8.	PW	A2241P1	Real-time Research Project	0	0	4	2
9.	ES	A224013	QMLR	0	0	2	1
10	ES	A224287	Basic Electrical Engineering Laboratory	0	0	2	1
Total				**14**	**0**	**12**	**20**

PROBABILITY AND STATISTICS

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223009	L	T	P	C	CIE	SEE	Total
	3	1	0	4	40	60	100

CourseOutcomes:

Afterlearningthecontentsofthiscourse,thestudentsmustableto:

1. To differentiate among random variables involved in the probability models which are useful for all branches of engineering.
2. Derive relationship among variety of performance measures using probability distributions.
3. Acquire elementary knowledge of parametric and non parametric –tests and understand the use of observing state analysis for predicting future conditions.
4. Identify and examine situations that generate using problems and able to solve the tests of ANOVA for classified data.
5. Apply proper measurements, Indicators and techniques of Correlation and regression analysis.

Syllabus

UNIT-I PROBABILITY AND RANDOM VARIABLES:

PROBABILITY: Introduction- Sample space and events- probability. The axioms of probability- some elementary theorems-conditional probability- Bayee's Theorem-

RANDOM VARIABLES: Random variable, Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution.

UNIT-II:PROBABILITY DISTRIBUTIONS:

Fitting of Binomial, Poisson & Normal distributions and their properties (only Statements) Moment Generating Functions of the above three distributions and hence finding the mean and variance.

UNIT-III: SAMPLING THEORY & TESTING OF HYPOTHESIS-I:

Sampling Distribution: Definition of Sample, Population, and Types of Sampling. Estimation-Point estimation, Interval estimation.

Testing of Hypothesis: Null hypothesis – Alternative hypothesis, Type I, & Type II errors – critical region confidence interval for mean, Testing of hypothesis for single mean and difference between the means for large samples.Confidence interval for the proportions, Tests of hypothesis for the proportions- single and difference between the proportions for large samples

UNIT-IV:TESTING OF HYPOTHESIS-II:

Small Samples - t-distribution, F-Distribution, χ^2 distribution, ANOVA for one-way classified data

UNIT-V:CORRELATION, REGRESSION & CURVE FITTING:

Correlation and Regression: Coefficient of Correlation-Regression coefficients- The lines of Regression- The Coefficient of Rank Correlation.

Curve Fitting: Fitting a Straight line – Second Degree Polynomials – Exponential and Power Curve by the Method of Least Squares.

Textbooks:

1. Probability and Statistics for Engineers, by Richard Arnold Johnson, Irvin Miller and John E Freund, New Delhi Prentice Hall.
2. Probability and Statistics, by T. K. V. Iyangar others, S. Chand Publications
3. Introduction to Probability & Statistics for Engineers and Scientists by Sheldon M.Ross

ReferenceBooks:

1. Fundamentals of Mathematical Statistics, by S C Guptha and V K Kapoor, S Chand.
2. Mathematics for Engineers and Scientists, by Alan Jeffrey, sixth edition, CRC press.

SURVEYING & GEOMATICS

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223103	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Identify a detailed surveying at any site by any method.
2. Ability to use modern survey equipment to measure angles and distances.
3. Compute the differences in elevation draw and utilize contour plots, volumes for earthwork.
4. Understand the working principles of modern equipment and its methodologies.
5. Analyze the basic concept of GPS and its applications.

Syllabus

UNIT-I Introduction to surveying

Overview of plane surveying (chain, compass, theodolite and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals.

UNIT-II Distances and direction

Distance measurement methods, use of chain, tape and electronic distance measurements, meridians, azimuths and bearings, declination, computation of angle.

UNIT-III Leveling and contouring

Concept and Terminology, Temporary adjustments – method of leveling. Characteristics and Uses of contours – methods of conducting contour surveys and their plotting. Embankments and cutting for a level section and two level sections with and without transverse slopes.

UNIT-IV Modern field surveying systems

Principle of electronic distance measurements, types of EDM instruments, distomat, total station – parts of a total station – accessories – advantages and applications, field procedure for total station survey, errors in total station survey.

UNIT-V Introduction to Geomatics

Global positioning systems – segments, GPS measurements, errors in biases, surveying with GPS, Co-ordinate transformation, accuracy considerations, electromagnetic spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, Remote sensing data acquisition, platforms and sensors, visual image interpretation, digital image processing.

Textbooks:

1. Surveying (Vol – 1 & 2), Duggal S K, Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 4th Edition, 2004.
2. Remote sensing geographical Information system, Anji Reddy M., B.S. publications, 3rd Edition, 2008

Reference Books:

1. Surveying and Leveling, R. Subramanian, Oxford University Press, 2nd Edition, 2012.
2. Advanced Surveying (Total Station GIS and Remote Sensing), Satheesh Gopi, R. Sathi Kumar and N. Madhu. Pearson Education India, 1st Edition, 2007.

ENGINEERING GEOLOGY

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223104	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Classify and compare different rocks and minerals across the construction site.
2. Identify and build the knowledge on main and most common igneous, sedimentary and metamorphic rocks encountered by foundations and sites.
3. Define And Interpret The Geological Structures In The Geological Maps And Cross Sections
4. Understand the importance of graphical studies and various geophysical methods.
5. Illustrate the factors which affect the dams, reservoirs and tunnels.

Syllabus

UNIT-I Introduction

Imp

Structural geology.

Weathering of rocks: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like “Granite”

UNIT-II Mineralogy:

Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties.Role of study of physical properties of minerals in the identification of minerals.Study of physical properties of some common rock forming minerals.[Examples: Feldsper, Quartiz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite]
Petrology: Definition of rock, Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous, Sedimentary and metamorphic rocks their distinguishing features, Megascopic and microscopic study of rocks[eg: Granite, Dolerite, Basalt, Pegmatite, Laerite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate]

UNIT-III Structural Geology

Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults uncomfornities, and joints – their important types and case studies. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils, Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT-IV Importance of geophysical studies

Principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radiometric methods and Geothermal method, Special importance of Electrical resistivity methods, and seismic refraction methods, Improvement of competence of sites by grouting etc, fundamental aspects of rock mechanics and Environmental Geology.

UNIT-V Geology of Dams, Reservoirs And Tunnels

Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site, analysis of dam failures of the past, factor's contributing to the success of a reservoir, geological factors influencing water lightness and life of reservoirs – Purposes of tunneling, effects of Tunneling on the ground role of Geological Considerations (i.e., Lithological, structural and ground water) in tunneling over break and lining in tunnels.

Textbooks:

1. Engineering Geology, N. Chennakesavulu, Trinity (Laxmi Publications Lmt), 2nd Edition, 2005.

Reference Books:

1. Principles of Engineering Geology & Geotechnics, DP Krynine & W R Judd, CBS Publishers,1st E Book Edition, 2018.
2. Engineering Geology, Subinoy Gangopadhyay, Oxford university press, 1st Edition, 2013.
3. Engineering Geology for Civil Engineers, P.C. Varghese, PHI Learning, 1st Edition, 2012.

SOLID MECHANICS – I

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223105	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Examine stress – strain, elastic constants and strain energy.
2. Analyze the shear force and bending moment diagrams of beams and relationship between them.
3. Evaluate the flexural and shear stresses for various beam cross sections.
4. Calculate principal stresses and strains using analytical and graphical solutions for the safety using failure theories.
5. Determine the deflections of beams with various loadings using different methods.

Syllabus

UNIT-I Simple Stresses and Strains

Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress-strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic modulii and the relationship between them – Bars of varying section – composite bars – Temperature stresses, Elastic constants.

Strain Energy: Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT-II Shear Force and Bending Moment

Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F, B.M and rate of loading at a section of a beam.

UNIT-III Flexural Stresses

Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y =E/R – Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

Shear stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT-IV Principal Stresses and Strains

Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

UNIT-V Deflection of Beams

Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load – Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

Textbooks:

1. Strength of Materials, R.K. Bansal, Lakshmi Publications Pvt. Ltd, 6th Edition, 2015.

Reference Books:

1. Mechanics of Structures Vol –I, H.J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt, 31st Edition, 2014.
2. Strength of Materials, D.S Prakash Rao, Universities Press Pvt. Ltd, 2nd Edition,1999.

FLUID MECHANICS

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223106	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand different properties of fluid and the relationship between them.
2. Explain the Continuity equation for one dimensional, two dimensional and three dimensional flows.
3. Apply the Euler's and Bernoulli's equations in practical civil engineering problems.
4. Analyse head losses in pipes and flow between parallel plates.
5. Demonstrate the boundary layer concepts and its separation.

Syllabus

UNIT-I Introduction

Dimensions and units – Physical properties of fluids, specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law – atmospheric, gauge and vacuum pressure – measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers. Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT-II Fluid kinematics

Description of fluid flow, Stream line, path line, streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flownet analysis

UNIT-III Fluid dynamics and measurement of flow

Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, Navier – Stoke's equations (Explanationary), Momentum equation and its application – forces on pipe bend. Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular, trapezoidal and Stepped notches–Broadcrested weirs

UNIT-IV Closed conduit flow

Reynold's experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction – Darcy's equation, ,variation of friction factor with Reynold's number – Moody's Chart, Minor losses – pipes in series
– pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems, flow between parallel plates, flow through long tubes, flow through inclined tubes.

UNIT-V Boundary Layers

Boundary layer – concepts, Characteristics of boundary layer along a thin flat plate, Prandtl contribution, Vonkarmen momentum integral equation, laminar and turbulent boundary layers (no derivations) BL in transition, separation of BL, control of BL, flow around submerged objects – Drag and Lift – Magnus effect.

Textbooks:

1. Hydraulics and Fluid Mechanics (Including Hydraulics Machines), Modi and Seth, Standard book house, 22nd Edition, 2019.

Reference Books:

1. A Textbook of Fluid Machines, R. K. Rajput, S. Chand & Company Ltd, 5th Edition, 2013.

SURVEYING & GEOMATICS LABORATORY

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223181	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Apply the principle of surveying for civil engineering applications
2. Apply the knowledge to ccalculate areas, drawing plans and contour maps using different measuring equipment at field level.
3. Identify data collection methods and prepare field notes.
4. Understand the working principles of survey instruments, measurement errors and corrective measures.
5. Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and its methodologies.

List of experiments:

1. Survey of an area by chain surveying.
2. Determination of two inaccessible points by using prismatic compass.
3. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
4. Radiation & intersection method by plane table survey.(Any one exercise).
5. Exercise on fly levelling using dumpy level.
6. An exercise on L.S, C.S and Plotting.
7. Trigonometric leveling – Heights and distance problem.
8. Determination of Area & Remote height using total station.
9. Traversing & Contouring using total station.
10. Distance, gradient, Diff. height between two inaccessible points using total station.
11. Study on use of GPS for data collection.
12. Collection of Point Data, Line Data, and Polygon Data using GPS.

ENGINEERING GEOLOGY LABORATORY

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223182	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. To study the physical properties and identification of minerals referred under the theory.
2. Describe and identify the rocks referred under the theory.
3. Illustrate the Microscopic study of rocks.
4. Interpret and draw the sections for geological maps showing tilted beds, faults, unconformities etc.,
5. Solve the simple structural geological problems.

List of experiments:

1. Study of physical properties and identification of minerals.
2. Study of physical properties and identification of rocks(igneous)
3. Study of physical properties and identification of rocks(sedimentary)
4. Study of physical properties and identification of rocks(metamorphic)
5. Microscopic study of rocks
6. Microscopic study of minerals
7. Study of geological structures like faults and folds
8. Study of geological structures like tilted bed models and unconformities
9. Interpretation and drawing of sections for geological maps showing tilted beds
10. Interpretation and drawing of sections for geological maps showing faults, unconformities.
11. Simple structural geology problems on Strike.
12. Simple structural geology problems on Dip

COMPUTER AIDED DRAFTING LABORATORY

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223183	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Assess the Software with aiding source.
2. Demonstrate the different modes of commands.
3. Draft the plan, Elevation & Sectional Views of the building.
4. Develop the components of the building.
5. Replicate the complete detailing of Building with BIM input.

List of experiments:

1. Introduction to concept of drawings through computer aided drafting (CAD).
2. Practice exercises on coordinate system reference planes , initial settings, drawing aids , Presentation norms and standards.
3. Practice Exercises on commands- drawing, Modifying, layers, text, blocks and dimensioning.
4. Practice on symbols and signs (materials, Architectural, structural, Electrical, Plumbing).
5. Drawing of single line plan - Single storey buildings.
6. Drawing of plans of Multi storied buildings with Brick thickness (Max G+2).
7. Developing sections and elevations of Single storey buildings.
8. Detailing of different types (any 2 types) of doors and its components by using CAD.
9. Detailing of different types (any 2 types) of windows and its components by using CAD
10. Exercises on the development of working of building (working drawing) by using CAD.
11. Drawing the complete layout of structure (Educational building).
12. Fundamentals of Building Information Modelling (BIM).

PROFESSIONAL COMMUNICATION

Department of Civil Engineering					II B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A223012	L	T	P	C	CIE	SEE	Total
	2	0	0	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Acquire enhanced personality
2. Demonstrate appropriate professional etiquette
3. Practice team building with strong communication skills
4. Develop problem solving skills and decision-making
5. Exhibit effective communication on digital platforms

Syllabus

UNIT-I

Introduction to Soft Skills

Soft Skills for personal and professional development
Self Introduction in various situations
SWOC Analysis
Goal setting

UNIT-II Professional Etiquette

Etiquette-Mobile Etiquette- Netiquette
Non-Verbal Communication
Presentations – Individual & Team
Time Management

UNIT-III Team Essentials

Leadership Skills
Team Building
Negotiation Skills
Group Discussion-Functional Aspects

UNIT-IV Decision Making & Problem Solving

Logical Thinking
Decision Making
Problem Solving
Critical Thinking

UNIT-V Digital Communication

Role of Multimedia in Communication
E-Mail
Social Networking: Importance and Effects.
Communication in Corporate World

Reference Books:

1. Ashrif Rizvi, Effective Technical Communication, Tata Mac Graw Hill, 2018.
2. Barun, K Mitra, Personality Development and Soft Skills, Oxford University Press, 2nd Edition, 2017.

BASIC ELECTRICAL ENGINEERING

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224208	L	T	P	C	CIE	SEE	Total
	2	0	0	2	40	60	100

Course Outcomes:

1. Understand basic principles of electrical elements.
2. Apply the concepts of AC circuits to various elements and combinations.
3. Examine principle and tests of transformer.
4. Contrast the working of DC machines and induction motors.
5. Assess working principle of AC generator and electrical installations.

Syllabus

UNIT-I

INTRODUCTION TO ELECTRICAL ENGINEERING AND DC CIRCUITS:

Basic definitions, Ohm's law, types of elements, types of sources, Kirchhoff's laws**,** resistive networks-series, parallel circuits, delta- star and star- delta transformation, Network theorems-Superposition, Thevenin's - simple problems.

UNIT-II

AC CIRCUITS: Representation of sinusoidal waveforms, peak, rms and average values. Phase representation of alternating quantities, analysis of AC circuits with single basic network element (R, L, C), single phase series circuits, concept of resonance, three-phase balanced circuits-voltage and current relations in star and delta connections(elementary treatment).

UNIT-III

TRANSFORMERS: Constructional details, principle of operation, ideal and practical single-phase transformer, losses in transformer, OC-SC tests, regulation and efficiency - simple problems.

UNIT-IV

DC MACHINES AND INDUCTION MOTORS

DC MACHINES: Construction, principle and operation of DC motor, voltage- torque equations - simple problems.

THREE PHASE INDUCTION MOTOR: Construction, principle and working of three phase induction motor, torque-slip characteristics-simple problems.

Single phase induction motor- Working principle.

UNIT-V

AC GENERATOR &ELECTRICAL INSTALLATION

AC GENERATOR: Construction, principle of operation of synchronous generator, EMF equation.

ELECTRICAL INSTALLATION: Fuse, circuit breakers, difference between fuse and circuit breaker, Types of batteries, battery backup.

Textbooks:

1. Basic Electrical Engineering - by T.K. Nagasarkar and M.S. Sukhija, Oxford University press.
2. Basic Electrical Engineering-by M.S. Naidu and S. Kamakshiah-TMH.

Reference Books:

1. Network Analysis by Sudhakar & Shyam Mohan.
2. Basic Electrical Engineering-by S.K. Bhattacharya, Pearson Publications.
3. Basic Electrical Engineering by K. Uma Rao and A. Jayalakshmi, IK Publications.

CONCRETE TECHNOLOGY

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224107	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understanding the properties of cements and admixtures.
2. Analyze the properties of aggregates.
3. Evaluate the properties of fresh concrete.
4. Analyze the behavior of hardened concrete and durability of concrete.
5. Design the concrete mix using IS Code and describes the special concretes.

Syllabus

UNIT-I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures : Types of admixtures – mineral and chemical admixtures

UNIT-II

Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieveanalysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT-III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT-IV

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspace ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength

Testing of Hardened Concrete: Compression test – Tension tests —Flexure tests – Splitting tests – Non-destructivetesting methods.

Elasticity, Creep & Shrinkage– Modulus of elasticity – Dynamic modulus of elasticity – Posisson's ratio – Creep ofconcrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage– types of shrinkage.

UNIT-V

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

Special Concretes: Introduction to Light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – High performance concrete –

Self compacting concrete.

Textbooks:

1. Concrete Technology, M.S.Shetty, S.Chand & Co, 7th Edition, 2015.
2. Concrete Technology, A.R. Santha Kumar, Oxford university Press, New Delhi, 9th Edition, 2012.

Reference Books:

1. Properties of Concrete, A. M. Neville, Pearson publisher, 5th Edition, 2011.
2. Concrete Technology, M.L. Gambhir, Tata Mc. Graw Hill Publishers, New Delhi, 5th Edition, 2004.

SOLID MECHANICS-II

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224108	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Design and safety of the shaft subjected to Torsion and bending moment.
2. Calculate the Column capacity for various end conditions due to axial and eccentric loading.
3. Apply the concepts of direct and bending stresses to evaluate the safety of Structures.
4. Evaluate the stresses and strains in thin shells and Thick Cylinders.
5. Determine the stresses due to Unsymmetrical bending of beams and locate the shear centre.

Syllabus

UNIT-I

Theory of pure torsion – Derivation of Torsion equations T/J = q/r = Nθ/L – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending, torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull – springs in series and parallel.

UNIT-II

Columns and struts: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns – assumptions – derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Perry's formula

UNIT-III

Direct and bending stresses: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

UNIT-IV

Thin Shells: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

Thick cylinders: Introduction – Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage.

UNIT-V

Unsymetrical bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in

beams subjected to unsymmetrical bending – Principal axis – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis - Deflection of beams under unsymmetrical bending.
Shear centre: Introduction – Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

Textbooks:

1. Strength of Materials, R. K. Bansal, Lakshmi Publications House Pvt. Ltd, 6th Edition, 2015.

Reference Books:

1. Strength of Materials, S.S. Bhavikatti, Vikas Publishing House Pvt. Ltd, 4th Edition, 2008.
2. Mechanics of Materials, R. C. Hibbeler, Pearson Education, 9th Edition, 2014.

STRUCTURAL ANALYSIS

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224109	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Analyze propped cantilever, fixed beams for external loadings and support settlements.
2. Understand the concept of Slope deflection, moment distribution method and analysis of continuous beams.
3. Examine the beams and arches.
4. Analyze the pin-jointed plane frames.
5. Draw the influence line diagram for moving loads.

Syllabus

UNIT-I

Propped cantilever and fixed beams: Determination of static and kinematic indeterminacies for beams, Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams – Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT-II

Continuous beams: Introduction – Continuous beams, Clapeyron's theorem of three moments – Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed – continuous beams with overhang, Effects of sinking of supports. Derivation of slope – deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method, Shear force and Bending moment diagrams.

UNIT-III

Energy theorems: Introduction – Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem – Unit Load Method. Deflection of simple beams and statically determinate bent frames.

Arches: Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches (Circular and parabolic arches without temperature effect and yielding of support).

UNIT-IV

Analysis of perfect frames: Types of frames – Perfect, Imperfect and Redundant pin jointed frames. Analysis of determinate pin jointed frames using method of joints, method of sections for vertical loads, horizontal loads and inclined loads.

UNIT-V

Moving loads and influence lines: Introduction maximum SF and BM at a given section and absolute maximum S.F.and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads – Equivalent

uniformly distributed load – Focal length. Definition of influence line for SF, Influence line for BM – load position for maximum SF at a section – Loadposition for maximum BM at a section – Point loads, UDL longer than the span, UDL shorter than the span – Influence lines for forces in members of Pratt and Warren trusses. Equivalent uniformly distributed load.

Textbooks:

1. Theory of Structures, S. Ramamrutham and R. Narayan, Dhanapat Rai Publishing company (P) Lt, 9th Edition2015.
2. Structural Analysis (Vol –I & II), V.N.Vazirani and M.M.Ratwani, Khanna Publishers, 17th Edition, 2015.

Reference Books:

1. Structural Analysis (Vol I & II), G.S. Pandit and S. P.Gupta, Tata McGraw Hill Education Pvt. Ltd, 2nd Edition,2008
2. Structural Analysis (Vol-I & II), S.S. Bhavikatti, Vikas Publishing House Pvt Ltd, 4th Edition, 2011.

HYDRAULICS & HYDRAULIC MACHINERY

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224110	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Determine the Froude number for a given flow to differentiate concepts of sub-critical, critical, and super-criticalflows.
2. Compute the non-uniform flow depths for gradually and rapid varied flow.
3. Apply dimensional analysis to predict physical parameters that influence the flow in fluid mechanics and usedimensionless parameters
4. Compute efficiencies of different types of turbines.
5. Use performance curves to predict performance of centrifugal pumps.

Syllabus

UNIT-I

Open channel flow-I

Introduction: Definition of open channel, Comparison between pipe flow and open-channel flow, Types of open channels, Geometric elements and hydraulic properties of an open channel section, Classification of open-channel flows– steady, unsteady, uniform, non-uniform, gradually varied, rapidly varied, spatially varied,

Uniform Flow: through open channel by Chezy's, Manning's, Kutter's, and Bazin formulae;; Computation of normal depth hydraulically efficient channel section.
Critical Flow: Specific energy, critical depth, computation of critical depth, critical, sub-critical, and super critical flows, alternate depths; Transitions – channel with a hump, and change in width.

UNIT-II

Open channel flow-II

Non Uniform flow: Gradually Varied Flow: Basic assumptions; Derivation of differential equation of GVF; Characteristics and classification of flow profiles for Mild, Critical, Steep, horizontal, and adverse slopes; control sections; Computation of GVF by numerical method – Direct-Step method.

Rapidly Varied Flow: Characteristics of RVF; Hydraulic Jump in horizontal rectangular channels – momentum equation formulation for the jump, energy loss; Classification of jumps according to Froude's number; Basic characteristics of the jump - Height of jump, length of jump, location of jump.

UNIT-III

Dimensional Analysis: Philosophy of DA; Principle of Dimensional Homogeneity; Methods used - Rayleigh's methodand Buckingham's Pi theorem; Common dimensionless groups in fluid mechanics.

Modelling and Similitude: Geometric, kinematic, and dynamic similarities; Similarity requirements or modelling laws;model and prototype relations; Definition of distorted and non-distorted models.

UNIT-IV

Impact of jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency

Turbines: Layout of a typical Hydroelectric power plant; heads and efficiencies- Classification of

turbines- pelton wheel turbine- francies turbine- Kaplan turbine; working proportions, velocity diagrams, work done, and efficiencies ofturbine; governing of turbines.

UNIT-V

Centrifugal Pumps: Components of a centrifugal pump; Working of a centrifugal pump, classification of pumps; Expression for work done on the impeller; heads of pumps, losses and efficiencies, minimum starting speed, Multistage pumps - Pumps in series and parallel. Performance of pumps- characteristic curves, Net positive suction head- cavitation.

Textbooks:

1. Hydraulics and Fluid Mechanics (Including Hydraulics Machines), Modi and Seth, Standard book house, 22ndEdition, 2019.

Reference Books:

1. A Textbook of Fluid Machines, R. K. Rajput, S. Chand & Company Ltd, 5th Edition, 2013.

SOLID MECHANICS LABORATORY

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224184	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Demonstrate of materials under impact, hardness, tensile and compressive loads.CO2: Determine elastic constants by flexural and torsion test. Compute the non-uniform flow depths for gradually and rapid varied flow.
2. Determine elastic constants by flexural and torsion test.
3. Illustrate spring constants under various loadings.
4. Understand the deflection of materials under bending.
5. Compute basic material properties stress and strain.

List of Experiments

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

FLUID MECHANICS & HYDRAULIC MACHINERY LABORATORY

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224185	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Examine the calibration of different flow meters.
2. Illustrate flow measuring devices used in pipes, channels and notches.
3. Determine major and minor losses in pipes.
4. Analyse the energy equation for problems in pipe flow.
5. Examine the performance characteristics of turbines and pumps.

List of Experiments

1. Calibration of venture meter and Orifice meter
2. Determination of coefficient of discharge for a small orifice/mouthpiece by constant head method
3. Calibration of contracted rectangular notch and triangular notch
4. Determination of friction factor of a pipe
5. Determination of coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of hydraulic jump.
9. Performance test on Pelton wheel turbine.
10. Performance test on Kaplan Turbine
11. Performance characteristics of a single stage /multi stage centrifugal pump.
12. Performance characteristics of a reciprocating pump

REAL TIME RESEARCH PROJECT

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2241P1	L	T	P	C	CIE	SEE	Total
	0	0	4	2	50	---	50

Course Outcomes:

1. Develop comprehensive solution to issues identified in project
2. Formulate a design proposal on a problem in area of interest.
3. Apply technical skills for analysis, design, simulation and modeling of various real time problems.
4. Synthesize the results of detailed analytical studies conducted.

Project-Based learning enables students real world opportunities to research issues, think critically, gain new perspectives, solve problems and develop written and oral communication skills all within the framework of a team environment and guided by faculty.

The course is for 2 credits with 2 contact hours in the time table and shall be evaluated for 50 marks.

There is NO External examination.

A batch consisting of three to four students, are expected to design and implement on a topic of their interest under the guidance of a faculty member. The formation of batches should be done during the first week of the class work.The expertise of the guide has to match with the area chosen by the batch carrying out the project.

The Project review committee (PRC) constituted by the Head of the Department , examines if the quantum of the proposed implementation meets the requirement of Real-time Research Project/ Field Based Project which will be evaluated for 50 Marks. Students are required to prepare a comprehensive report after the completion of the work.

The PRC shall conduct TWO reviews to assess the progress of the work carried out with respect to the following rubrics. The student shall have to earn 40% i.e., 20 Marks out of 50 Marks from average of the two evaluations.

S.No.	PROJECT REVIEW I	MARKS
Problem statement and Literature review on the Problem identified before Mid-1		
I	Abstract	
II	Understanding background and topic	
III	Specific Project Objectives	
IV	Literature Survey	

V	Project planning / Division of modules	
VI	Presentation skills	
	Total	**50 M**
	PROJECT REVIEW II	
Results/ Working model solution to the Problem identified before Mid - II		
1	Proposed Methodology	
II	Summary of the findings of Project	
III	Results obtained and performance Evaluation	
IV	Report of the Project	
V	Presentation skills	
VI	Presentation skills	
	Total	**50 M**
Average of Project reviews I and II		**50M**

The student is deemed to have failed, if he (i) does not submit a report on the Project, or does not make a presentation of the same before the Project Review Committee as per the schedule, or (ii) secures less than 40% marks in the course.

QUANTITATIVE METHODS & LOGICAL REASONING
(Common for all Branches)

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224013	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. To perform well in various competitive exams and placement drives.
2. To solve basic and complex mathematical problems in short time.
3. To become strong in Quantitative Aptitude and Reasoning which can be applied for GRE, GATE, GMAT or CAT exam also.
4. To develop problem solving skills and analytical abilities, which play a great role in corporate and industry set up.

Syllabus

UNIT-I

Number System: Speed Maths, Numbers, Factors, Prime & Co Primes, LCM & HCF, Divisibility Rules, Finding Unit Place Digit and Last Two Digits of an Expression

Ratio, Proportion and Variations: Definition of Ratio, Ratio of Proportion, Comparison of Ratios, Compound ratio, Direct and Indirect Proportion

Percentages: Converting Fractions and Decimal into Percentages, Successive Percentage, Populations, Expenditure and Savings

Profit and loss: Relation between Cost Price and Selling Price, Discount and Marked Price, Gain or Loss Percentages on Selling Price

Simple and Compound Interest: Problems on Interest (**I**), Amount (**A**), Principal (**P**) and Rate of Interest (**R**) difference between the Simple Interest and Compound Interest for 2 and 3 years.

UNIT-II

Partnership: Relation between Partners, Period of Investment and Shares

Averages, Ages and Allegation : Average of Different Groups, Change in Averages by Adding, Deleting and Replacement of Objects, Problems on ages, Allegation Rule, Mean Value of the Mixture, Replacement of Equal Amount of Quantity.

Time and Work: Men and Days, Work and Wages, Pipes and Cisterns, Hours and Work, Alternate Days Concept,

Time and Distance: Difference between the Average and Relative Speeds, Reaching the Destination Late and Early, Stoppage Time Per Hour, Time and Distance between Two Moving Bodies : Train Crossing Man - same and opposite directions, Speed of Boat and Stream,

UNIT-III

Progressions and Quadratic Equations: Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic Mean and their Relations. General form of Quadratic Equation, Finding the Roots of Quadratic Equation, Nature of the Roots.

Permutation and Combination: Fundamental Rules, Problems on Permutations & combinations.

Probability: Definition of probability, Notations and Formulae, Problems on Probability.

Data Interpretation and Data Sufficiency: Tabular and Pie-charts, Bar and Line Graphs, Introduction to Data Sufficiency, Problems on Data Sufficiency.

UNIT-IV

Deductions: Statements and conclusions using Venn diagram and Syllogism Method

Series completion: Number series, Alphabet series, Letter Series.

Coding and Decoding: Letter coding, Number coding, Number to letter coding, Matrix Coding, Substitution, Mixed Letter Coding, Mixed Number Coding, Deciphering Individual Letter Codes by Analysis.

Analytical Reasoning Puzzles:
Problems on Linear, Double line-up and Circular Aarrangements, Selections and Comparisons.

Blood Relations:
Defining the various Relations among the Members of a Family, Solving Blood Relation Puzzles by using Symbols and Notations**.** Problems on Coded Relations.

UNIT-V

Direction sense Test: Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.

Clocks: Relation between Minute-Hour Hands, Angle vs Time, Exceptional Cases in Clocks

Calendars: Definition of a Leap Year, Finding the Odd days, Finding the Day of any Random Calendar Date, repetition of Calendar Years.

Cubes and Dices: Finding the Minimum and Maximum Number of Identical Pieces and Cuts, Painting of Cubes and cuts, Problems on Dice.

Venn Diagrams: Circular Representation of given words, Geometrical Representation of Certain class, Set theory based Problems.

Textbooks:

1. Verbal Reasoning, GL Barrons, Pinterest, Latest Edition 2019
2. A Modern Approach to Logical Reasoning & Quantitative Aptitude, R S Agarwal, S. Chand, Publications, Revised edition, 2019

Reference Books:

1. Quantitative Aptitude, G.L Barrons, Pinrest 2019
2. Quantitative Aptitude, Abhijit Guha, Mc Graw Hills, Edition 2019
3. Quantitative Aptitude, U. Mohan Rao SCITECH

BASIC ELECTRICAL ENGINEERING LABORATORY

Department of Civil Engineering					II B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A224287	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

1. Understand basic electrical laws.
2. Examine the resistance, current and voltage using concepts of electric circuits
3. Analyse the response of different electrical circuits.
4. Apply electric laws and find out performance of various electrical machines
5. Asses the losses in electrical machines

List of experiments/demonstrations:

Any 5 experiments from Part-A and Part-B should be conducted (Total 10 Experiments)

Part-A

1. Verification of Ohms law
2. Verification of KVL and KCL
3. Verification of Thevenin's Theorem
4. Verification of Superposition Theorem
5. Determination of equivalent resistance, current and voltage across each element in a given circuit.
6. Determination and Verification of Impedance and Current of RL and RC series circuits

Part-B

1. Verification of Mesh Analysis.
2. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
3. OC & SC Test on Single phase transformer
4. Brake test on DC shunt motor
5. Brake test on Three Phase Squirrel cage induction motor.
6. OCC of Three phase alternator.

REFERENCE BOOKS:

1. Sudhakar and Shyam Mohan, "Circuits and Networks" Tata Mc Graw Hill Companies.
2. P.S.Bimbra, "Electrical Machines", Khanna Publishers.

DEPARTMENT OF CIVIL ENGINEERING

III Year I Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1	HSMC	A225015	Business Economics & Financial Analysis	3	0	0	3
2	PC	A225111	Geotechnical Engineering	3	0	0	3
3	PC	A225112	Design of Reinforced Concrete Structures (SE-I RCC)	3	0	0	3
4	PC	A225113	Water Resources Engineering	3	0	0	3
5	PE	1.A225114 2. A225115 3. A225116	Professional Elective – I 1. Advanced Structural Analysis 2. Green Building Technologies 3. Air Pollution and Control Methods	3	0	0	3
6	OE		Open Elective - I	3	0	0	3
7	PC	A225186	Geotechnical Engineering Laboratory	0	0	2	1
8	HSMC	A225087	Advanced English Communication Skills Laboratory	0	0	2	1
9	MC	A225016	Environmental Science	2	0	0	0
Total				**20**	0	**4**	**20**

III Year II Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	PC	A226119	Environmental Engineering	3	0	0	3
2.	PC	A226120	Foundation Engineering	3	0	0	3
3.	PC	A226121	Design of Steel Structures (SE-2 Steel)	3	0	0	3
4.	PE	1. A226122 2. A226123 3. A226124	Professional Elective – II 1. Ground water hydrology 2. Ground Improvement Techniques 3. Finite Element Method	3	0	0	3
5.	OE		Open Elective – II	3	0	0	3
6.	PC	A226187	Environmental Engineering Lab	0	0	2	1
7.	PC	A226391	Computer Aided Design Lab	0	0	2	1
8.	PC	A226188	Concrete Technology & Highway Materials Lab	0	0	2	1
9.	PW	A2261P1	Industry Oriented Mini Project/Internship	0	0	4	2
10.	MC	A226019	Gender Sensitization	2	0	0	0
	Total			**17**	**0**	**10**	**20**

Business Economics & Financial Analysis

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225015	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes: At the end of the course the students are expected to

1. Understand the nature and scope of business economics.
2. Analyze the Demand, Supply Functions and to forecast the demand.
3. Understand the concept of production and its relationship with business operations
4. Analyze the Financial Statements of a Company.
5. Compare and interpret the Financial Statements of a Company using ratios.

UNIT-I

Introduction to Business and Economics: Types of Business Entities, Theory of Firm, Capital and Sources of Capital for a Company, Economics - Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Types of Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT-II

Demand and Supply Analysis: Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT-III

Production, Cost, Market Structures & Pricing: Production Analysis: Factors of Production, Production Function, Production Function with onevariable input, two variable inputs, Returns to Scale. Cost analysis: Types of Costs. Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.

UNIT-IV

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, and Preparation of Final Accounts.

UNIT-V

Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios,Solvency, Leverage Ratios (simple problems).

Textbooks:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.
3. GeethikaGhosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012

Reference Books:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225111	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Illustrate the soil formation and classification.
2. Explain the Hydrostatic effect in soil mass
3. Illustrate the stress distribution mechanism and compaction in soil mass.
4. Illustrate the mechanism of consolidation.
5. Identify the Shear strength parameters through analytical and experimental approach.

Syllabus

UNIT-I

Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass,volume relationship – Relative density.

Index properties of soils: Grain size analysis – Sieve and Hydrometer methods –consistency limits and indices – I.S. Classification of soils.

UNIT-II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law, Permeability – Factors affecting –laboratory determination of coefficient of permeability – Permeability of layered soils – Insitu permeability tests (Pumping in & pumping out test).

Effective stress & seepage through soils: Total, neutral and effective stresses – principle of effective stress – quick sand condition – Introduction to Seepage through soils – Flow nets – Characteristics and Uses of flow nets.

UNIT-III

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties. – Field compaction Equipment – compaction quality control.

Stress distribution in soils: Boussinesq's and Westergaard's theories for point loads ,uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under a point load along the vertical and horizontal plane.

UNIT-IV

Consolidation: Types of compressibility – immediate settlement, primary consolidation and Secondary consolidation – stress history of clay; e-p and e-log-p curves – normal consolidation soil, over consolidated soil and under consolidated soil – pre-consolidation Pressure and its determination – Terzaghi's 1-D consolidation theory.

UNIT-V

Shear strength of soils: Introduction of shear strength – Mohr - Coulomb Failure theories – Types of laboratory strength tests – Direct Shear test, Vane shear test – strength tests based on drainage conditions – Tri-Axial test strength envelops – Shear strength of sands – dilatancy, Critical void ratio – Concept of liquefaction.

Textbooks:

1. Soil Mechanics and Foundation Engineeringg, Dr. K.R Arora, Standard Publishers and Distributors, Delhi, 7thEdition, 2010.

Reference Books:

1. Principles of Foundation Engineering, Braja M. Das, Cengage Learning, 7th Edition, 2011.
2. Basic and applied soil mechanics, Gopal Ranjan & ASR Rao, New Age International Pvt.ltd, New Delhi, 3rd Edition, 2016.

DESIGN OF REINFORCED CONCRETE STRUCTURES (SE-I) RCC

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225112	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand the various design concepts and design a beam under flexure and draw the reinforcement details.
2. Design the beam under shear and torsion, Calculate the anchorage and development length and check theserviceability requirements for RC structural elements.
3. Analyze and solve various RC slabs and draw the reinforcement details.
4. Classify short, long columns and draw the reinforcement details
5. Explore the design concept of footing & staircase.

Syllabus

UNIT-I

Concepts of RC design: Introduction- Structure - Components of structure - Different types of structures - Loads – Different types of Loads – Dead Load, Live Load, Earthquake Load and Wind Load - Working stress method – Ultimate load method – Limit State method – Stress-strain curve for concrete, steel – Partial safety factor – Characteristic values – Stress Block parameters – IS: 456 2000 provisions.

UNIT-II

Design and detailing of beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT-III

Shear, torsion and bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, IS Code provisions. Design examples in simply supported and continuous beams, detailing. Limit state of serviceability for deflection and cracking – IS Code provisions.

UNIT-IV

Design and detailing of slabs: Design of one way, two way and continuous slabs using IS Codal provisions and coefficients, Cantilever slab / Canopy slab. Introduction to Yield line theory.

UNIT-V

Design and detailing of short column: Subjected to axial loads, uniaxial and biaxial bending – IS Code provisions.

Design and detailing of footings: Different types of footings – Design of isolated, square, rectangular and circular footings – Introduction to combined footings.

Textbooks:

1. Limit state design of reinforced concrete, Dr. B. C. Punmia, and A. K. Jain, Laxmi Publications, 2nd Edition,2016.

Reference Books:

1. Fundamentals of Reinforced Concrete design, M.L Ghambhir, Prentice Hall of India,5th Edition, 2011.
2. Plain and Reinforced Concrete (Vol. I), Jain & Jai krishna, Nemchand Brother, 8th Edition, 2012.

IS Code

1. IS: 456 2000 Indian Standard plain and reinforced concrete - code of practice (Fourth

Revision) Tenth ReprintAPRIL 2007.
2. SP16, Design Aids for Reinforced Concrete to IS 456:1978

Note : IS: 456 2000 and SP16 need to be provided during examination

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225113	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Describe the components in the hydrologic cycle and interaction among various processes in the hydrologic cycle
2. Analyze the flood and its measurement by means of hydrograph.
3. Analyze the phenomenon of Ground water occurrence by means of aquifers.
4. Assess the methods of irrigation and its quality with the help of duty delta relationship.
5. Design the canals by using standard theories.

Syllabus

UNIT-I

Introduction to engineering hydrology and its applications: hydrologic cycle, Types and forms of precipitation, Rainfall Measurement, Different types of rain gauges, rainfall measurement, computation of average rainfall over a basin, processing of rainfall data- Adjustment of record – rainfall double mass curve. Runoff- factors affecting runoff- runoff over a catchment – Empirical and rational formulae.

Abstraction from rainfall- evaporation, factors affecting evaporation, measurement of evaporation- evapotranspiration- penman and balney & creddle methods- infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT-II

Flood measurement and analysis: Distribution of runoff – Hydrograph analysis flood hydrograph-effective rainfall-base flow-base flow separation- direct runoff hydrograph-Unit Hydrograph, definition and limitations of applications of unit hydrograph, derivation of unit hydrograph from direct runoff hydrograph and vice versa- S- Hydrograph, Syntheticunit hydrograph.

UNIT-III

Ground water occurrence: types of aquifers, Aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, Steady radial flow to wells in confined and unconfined aquifer. Types of wells – Well construction- well development.

UNIT-IV

Necessity and importance of irrigation: Types of irrigation, advantages and ill effects of irrigation,. Indian agricultural soils, Rabi and Kharip seasons, methods of improving soil fertility- crop rotation, preparation of land for irrigation, standards of quality for Irrigation water, crop period, base period, kor period, Duty and delta, factors affectingduty, efficiencies. Water Logging

UNIT-V

Canals and its design: Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design, canal lining.

Certain important definitions: GCA, CCA, intensity of irrigation, Design capacity of an irrigation canal, Computation ofdesign capacity. Stream Gauging – measurement and estimation of stream flow.

Textbooks:

1. Engineering Hydrology, Jayaram Reddy, Laxmi publications pvt. Ltd., 3rd Edition, 2016.
2. Irrigation and Hydraulic structures, S.K. Grag, Khanna Publishers, 21st Edition. 2009.

Reference Books:

1. Irrigation and water power engineering, B. C. Punmia, P.B.B Lal, A.K. Jain & A.K. Jain, Laxmi publicationspvt. Ltd., 16th Edition, 2014.

ADVANCED STRUCTURAL ANALYSIS (PE1)

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225114	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Analyze the continuous beams, portal frames by Kani's method.
2. Demonstrate the Indeterminacy of Trusses by Castiglione's second theorem.
3. Evaluate the shear forces and bending moments in Two-Hinged arches and to execute secondary stresses due to rise of temperature and Elastic Shortening of rib.
4. Analyze the Multi-storey frames by approximate methods for gravity (vertical) and horizontal loads.
5. Understand the concept of Matrix method for the analysis of continuous beams and Pin jointed plane frames.

Syllabus

UNIT-I

Kani's method: Analysis of continuous beams and portal frames including side sway due to unsymmetrical vertical loading.

UNIT-II

Indeterminate Trusses: Analysis of trusses having single and two degrees of internal and external indeterminacies – Castigliano's second theorem.

UNIT-III

Two hinged arches: Introduction – classification of two hinged arches – analysis of two hinged parabolic arches, analysis of circular arches – secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT-IV

Approximate methods of analysis: Introduction – Analysis of multi – storey frames for lateral loads: Portal Method, Cantilever Method. Analysis of multi storey frames for gravity (vertical) loads. Substitute frame method.

UNIT-V

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy – Stiffness method - Analysis of continuous beams including settlement of supports - Analysis of pin-jointed determinate plane frames – Analysis of single bay single storey frames, including side sway.

Flexibility method -Analysis of continuous beams up to three degrees of the indeterminacy.

Textbooks:

1. Theory of Structures, S. Ramamrutham, Dhanpat Rai Publishing Company, 9th Edition, 2015.
2. Strucrual Analysis-II, S.S Bhavikatti, Vikas Publishing house pvt.Ltd, 4th Edition, 2011.

Reference Books:

1. Analysis of Structures (Vol -I and II), Vazrani, M.M Ratwani and S.K Duggal, Khanna publishers, 2009.

GREEN BUILDING TECHNOLOGIES PE-I

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225115	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand the Green building concept and focus on approaches that makes building sustainable.
2. Illustrate Green building assessment and accreditation system.
3. Able to apply low energy building strategies.
4. Analyze the Multi-storey frames by approximate methods for gravity (vertical) and horizontal loads.
5. Classify the economic benefits of green buildings.

Syllabus

UNIT-I

Introduction: The shifting landscape of Green buildings, The driving forces for sustainable construction, Ethics and sustainability, Basic Concepts and Vocabulary, Major Environmental and resource concerns. International Building Assessment systems.

UNIT-II

The green building assessment system: Structure of the LEED suite of Building rating systems, LEED Credentials, LEED Building Design and construction Rating system, Green Globes Building Rating Tools, Structure of Green Globes for New Construction, Green Globes Assessment and Certification Process, Green Globes Professional Credentials, IGBC Building design, Rating system and Professional credentials, Green Building Documentation Requirements

UNIT-III

Green building design: Conventional versus Green Building Systems, green materials, material selection criteria, Executing the Green Building Project, Integrated Design Process, Role of the charrette in the design process.

UNIT-IV

Low – energy building strategies: Building Energy Issues, High – Performance Building Energy Design Strategy, Passive Design Strategy, Building Envelope, Internal Load Reduction, Smart Buildings and Energy Management Systems.

UNIT-V

Green building economics and sustainable construction: General approach, The Business Case for High – Performance Green Buildings, Economics of Green Building, Quantifying Green Building Benefits, Articulating Performance Goals for Future Green Buildings.

Textbooks:

1. Sustainable Construction, Charles J. Kibert, John Wiley & sons, 4th Edition, 2016.
2. Sun, Wind & Light- Architectural design strategies, Mark Dekay & G.Z Brown, John Wiley & sons, 3rd Edition,2014

Reference Books:

1. IGBC Reference Manual (2016)

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225116	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Find the sources, causes & effects of air pollution.
2. Understand the meteorological components and the plume behavior for atmospheric stability conditions.
3. Identify the types of equipments to control the particulates at sources.
4. Minimize the control measures of NOX, SOX and other gaseous emissions.
5. Demonstrate the factors for siting an industry by examining the air quality standards.

Syllabus

UNIT-I

Air Pollution: Definitions, Air Pollution Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution- stationary and mobile sources. Effects of Airpollutants on man, material and vegetation; Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc

UNIT-II

Meteorology: plume Dispersion; properties of the atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Significance of various meteorological parameters in air pollution, wind rose diagrams. Lapse Rates, Pressure Systems.

UNIT-III

Control of particulates –Control at Sources-Raw material changes, Process Changes, Equipment modifications or replacement, Equipment's – Settling Chambers, Centrifugal separators or cyclones, , Fabric filters, Electrostatic precipitator and Wet scrubbers.

UNIT-IV

Control of gaseous emissions: Adsorption, Absorption, Combustion, Sox Control technology- Natural dispersion by dilution, Using alternate fuels, removal of sulphur from fuels(Desulfurization),NOx Control technology- NOx control by modification of operating and design conditions- Low Excess air combustion, Decreasing Combustion air temperature, Two stage combustion, Flue gas recirculation.

UNIT-V

Air Pollution Monitoring and management: Environmental guidelines for siting of industries, Environmental impact assessment, Stack emission standards Ambient air quality standards, air pollution control act. Ambient air quality monitoring- location of stations, Duration of sampling period, SPM sampling, Gaseous sampling.

Textbooks:

1. Air pollution and Control, K.V.S.G. Murali Krishna, Laxmi Publications, 1st Edition, 2015.

Reference Books:

1. An introduction to air pollution, R.K. Trivedy and P.K. Goel, B.S publications, 2nd Edition,1986.
2. Environmental pollution control engineering, C.S. Rao, New Age International, 2nd Edition, 2006.

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225186	L	T	P	C	CIE	SEE	Total
		0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Demonstrate the engineering properties the soil.
2. Illustrate the field bulk and dry density of cohesive and cohesion less soils.
3. Classify the Coarse grained soils based on sieve analysis test & a grain size distribution curve.
4. Compute the shear strength of cohesive and cohesion less soil.
5. Determine the permeability of coarse grained soil and fine grained soil by constant head permeability test andfalling head method.

List of Experiments

1. Atterberg's limits
2. Field density- core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant head test.
5. Permeability of soil variable head test.
6. Compaction test
7. C.B.R test
8. Consolidation test
9. Unconfined compression test
10. Triaxial compression test
11. Direct shear test
12. Vane shear test.

(Common to all branches)

Department of Civil Engineering					III B.Tech I Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A225087	**L**	**T**	**P**	**C**	CIE	SEE	Total
		0	**2**	**1**	**40**	**60**	**100**

Course Outcomes:

At the end of the course a student is expected to:

1. Enhance reading and active listening techniques for a faster and better comprehension.
2. Exhibit strong writing skills to exhibit ideas effectively in social and professional situations.
3. Demonstrate effective presentation skills.
4. Develop critical thinking, problem-solving, decision-making and communication skills.
5. Display confidence during job interviews.

SYLLABUS:

1. **Activitieson ListeningandReadingComprehension:** ActiveListening–Development of Listening Skills Through Audio clips - Benefits of Reading– Methods and Techniques ofReading–BasicStepstoEffectiveReading– CommonObstacles–DiscourseMarkers orLinkers -Sub- skillsofreading –Readingfor facts, negative facts andSpecificDetails-Guessing Meanings from Context, Inferring Meaning-Critical Reading—Reading Comprehension–Exercises for Practice.

2. **Activities on Writing Skills**: Vocabulary for Competitive Examinations – Planning for Writing – Improving Writing Skills-Structure and presentation of different types of writing–Free Writing and Structured Writing- Letter Writing –Writing a Letter of Application –Resume vs. Curriculum Vitae–Writing a Résumé–Styles of Résumé-e-Correspondence–Emails–Blog Writing- (N)etiquette– Report Writing – Importance of Reports – Types and Formats of Reports– Technical Report Writing– Exercises for Practice.

3. **ActivitiesonPresentationSkills-**Startingaconversation–respondingappropriatelyand relevantly – using the right language and body language–Role Play in different situations including Seeking Clarification, Making a Request, Asking for and Refusing Permission, Participating in a Small Talk– Oral presentations (individual land group) through JAM sessions-PPTs–Importance of Presentation Skills– Planning, Preparing, Rehearsing and Making a Presentation – Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery - Presentations through Posters/Projects/Reports – Checklist for Making a Presentation and Rubrics of Evaluation.

4. **Activities on Group Discussion (GD):**Types of GD and GD as a part of a Selection Procedure- Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas– Do's and Don'ts-GD Strategies – Exercises for Practice.

5. **Interview Skills**: Concept and Process - Interview Preparation Techniques - Types of Interview Questions–Pre-interview Planning, Opening Strategies, Answering Strategies- Interview through Tele-conference & Video-conference - Mock Interviews.

Minimum Requirement:

TheAdvancedEnglishCommunicationSkills(AECS)Laboratoryshallhavethe following infrastructural facilities to accommodate at least 35 students in the lab:

- Spaciousroomwithappropriateacoustics
- RoundTableswithmovablechairs
- Audio-visualaids
- LCDProjector
- PublicAddresssystem
- OnePCwithlatestconfigurationfortheteacher
- T.V,adigitalstereo&Camcorder
- HeadphonesofHighquality

SuggestedSoftware:

1. TOEFL&GRE(BARRONS,USA,CrackingGREby CLIFFS)
2. OxfordAdvancedLearner'sDictionary,10Editionth
3. CambridgeAdvancedLearner'sDictionary.

Textbooks:

1. Rizvi, M. Ashraf (2018). *Effective Technical Communication*. (2 ed.).McGrawHill Education (India) Pvt. Ltd.
2. Bailey,Stephen.(2018).Academic *Writing:AHandbookforInternationalStudents.*(5 Edition).th Routledge.

Reference Books:

1. Raman,Meenakshi&Sharma,Sangeeta.(2022).*TechnicalCommunication,Principles and Practice.* (4thEdition) Oxford University Press.
2. Anderson,PaulV(2007).*TechnicalCommunication***.**CengageLearningPvt.Ltd.New Delhi.

ENVIRONMENTAL SCIENCE

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225016	L	T	P	C	CIE	SEE	Total
	2	0	0	0	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity.
2. Explain the limitations of the resources and impacts of over utilization of all natural resources.
3. Explain the sources and effects of environmental pollutions and list the available techniques to control the pollution.
4. Explain the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, and environmental audit and list the EIA methods.
5. Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability.

Syllabus

UNIT-I

Ecosystem: Definition, Scope and Importance of ecosystem, Structure and Functions of ecosystem: Food chains, Food Web and Ecological Pyramids, Flow of energy; Bio-magnification.

Biodiversity and Biotic Resources: Introduction, Definition, levels of Biodiversity, Value of biodiversity, Hot spots of biodiversity, Threats to biodiversity, conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-II

Natural Resources: Classification of Resources, **Water resources**: use and over utilization of surface and ground water, Dams: benefits and problems, Rain water harvesting; **Energy resources**: growing energy needs, Renewable and Non Renewable Energy resources. **Land resources**: land degradation – Landslide and Soil Erosion; **Forest Resources –** Uses and Exploitation.

UNIT-III

Environmental Pollution And Control: Types of Pollution, Sources, Effects and Control measures of Air Pollution ,Water Pollution ,Soil Pollution and Noise Pollution.

UNIT-IV

Global Environmental Problems and Global Efforts: Green house effect, Global Warming, climate change and their impacts on human environment; Ozone depletion and Ozone depleting substances (ODS); Aid Rains.

Environmental Impact Assessment (EIA): Scope of EIA and EIA methods, scope of Environmental audit and Environmental Management Plan.

UNIT-V

Environmental Policy, Legislation, Rules And Regulations: Salient features of Environmental Protection act, Air (Prevention and Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Forest Conservation Act, Municipal solid waste, Hazardous waste, E-waste, Bio-medical waste, Radioactive waste Rules.

Towards Sustainable Future: Concept of Sustainable Development, Sustainable goals defined by UN, Threats to Sustainability, Environmental Education, Role of IT in Environment, Smart Cities, Concept of Green Building, Low Carbon Lifestyle, Life cycle assessment and Ecological Foot Print.

Textbooks:

1. Text Book of Environmental Studies by Anubha Kaushik (4th Edition), New age International Publishers.
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

Reference Books:

1. *Textbook of Environmental Science and Technology by M. Anji Reddy,2007.*
2. *Text Book of Environmental Studies by Anubha Kaushik (3rd Edition), New age International Publishers.*

3. *Environmental Science : Towards a Sustainable Future by Richard T. Wright,2008 PHL Learning Private Ltd, New Delhi.*

ENVIRONMENTAL ENGINEERING

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226119	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

6. Predict the population by different methods.
7. Design the filter and settling tanks for water treatment.
8. Examine the characteristics of sewage.
9. Analyse and design the sewers for sewerage system.
10. Design different units of sewage treatment plant.

Syllabus

UNIT-I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards, sourcesof water – Comparison from quality, quantity and other considerations – intakes – infiltration galleries.

UNIT-II

Layout and general outline of water treatment units: sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants - feeding arrangements, Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of chlorination, chlorine demand - other disinfection practices- Miscellaneous treatment methods.

UNIT-III

Water distribution systems: Types of layouts of distribution system- design of distribution system- Hardy cross and equivalent pipe methods – service reservoirs – determination of storage capacity. Conservancy and water carriage systems – sewage and storm water estimation – time of concentration –storm water overflows, combined flow-characteristics of sewage– examination of sewage – B.O.D – C.O.D equations.

UNIT-IV

Design of sewers: Hydraulic formulae, Maximum and minimum velocities in sewer, Differences in the design of watersupply pipes and sewer pipes, Shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fitting traps
– one pipe and two pipe systems of plumbing.

UNIT-V

Design of different units: primary sedimentation tank – design of screens – grit chambers – principles and design of biological treatment – trickling filters, activated sludge process, oxidation diches.

Textbooks:

1. Water Supply Engineering (Vol. 1), B.C. Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt. Ltd, 2ndEdition, 2016.
2. Waste water Engineering (Vol. II), B.C. Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt. Ltd, 2ndEdition, New Delhi, 2016.

Reference Books:

1. Sewage Disposal and Air Pollution Engineering, Santhosh kumargarg, Khanna Publications, 24th Edition,2012.
2. Water Supply and Sanitary Engineering, G.S. Birdie, Dhanpat Rai Publishing Company, th Edition, 2011.

FOUNDATION ENGINEERING

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226120	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Organize the preparation and programme of soil investigation.
2 Examine the earth pressure theories and stability of retaining walls.
3. Evaluate the bearing capacity of soil and allowable settlement.
4. Analyze the capacity and settlement of pile foundation.
5. Analyze the stability of finite and infinite slopes using various methods.

Syllabus

UNIT-I

Soil Exploration: Need – methods of soil exploration – boring and sampling methods – penetration tests – plate loadtest – pressure meter – planning of soil exploration programme and preparation of soil investigation report.

UNIT-II

Earth pressure theories: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory

Retaining walls: Types of retaining walls – stability of gravity and cantilever retaining walls against overturning, sliding and, bearing capacity. Drainage from backfill, introduction to reinforced earth walls.

UNIT-III

Bearing capacity and settlement of foundation: Types - choice of foundation – location and depth of foundation - safe bearing capacity — Terzaghi, Mayerhoff, Skempton and IS methods.– Safe bearing pressure based on SPT N – value- Allowablebearing pressure; safe bearing capacity- allowable settlement of structures and plate load test.

UNIT-IV

Pile foundation: Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae– Pile Capacity through SPT and CPT results - pile load tests - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction.

UNIT-V

Slope stability: Infinite and finite earth slopes – types of slope failures – factor of safety of infinite slopes – stability analysis by Swedish slip circle method, method of slices, Bishop's Simplified method of slices – Taylor's Stability Number.

Textbooks:

1. Soil Mechanics And Foundation Engineering , K.R. Arora, Standard publishers,7th Edition, 2010.

Reference Books:

1. Principles of Foundation Engineering, Braja M. Das, Cengage Learning, 7th Edition, 2011.

DESIGN OF STEEL STRUCTURES (SE-2 Steel)

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226121	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Classify the types of connections and specifications as per IS: 800-2007.
2. Apply the provisions of IS: 800-2007 to design tension members.
3. Analyze and design compression members.
4. Illustrate behavior of beams and design strengths as per IS code.
5. Adapt IS code procedures to design welded plate girder.

Syllabus

UNIT-I

Introduction: Materials – types of structural steel – mechanical properties of steel – Concepts of plasticity - yield strength. Loads – and combinations local buckling behavior of steel. Concept of limit State Design – Limit States – Design Strengths- deflection limits – serviceability – stability check,

Connections: Bolted connections – Riveted connections– IS – 800 – 2007 - specifications – Design strength – efficiency of joint – prying action. Welded connections – Typesof welded joints – specifications - design requirements.

UNIT-II

Design of tension members: Design strength – Design procedure – Design of Tension member - Design procedure splice - lug angle.

UNIT-III

Design of compression members: Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns

UNIT-IV

Design of Beams: Design of Beams – Plastic moment – Bending and shear strength / buckling – Built-up sections – laterally / supported beams –Web Buckling and Web Crippling strength.

UNIT-V

Design of Welded Plate girders – elements – economical depth – design of main section – connections between weband flange – design of end bearing stiffenersand intermediate stiffeners.

Textbooks:

1. Design of steel structures, N. Subramanian, Oxford University Press, 1st Edition, 2009.
2. Design of steel structures, S. K. Duggal, Tata McGraw-Hill Education, 2nd Edition 2010.

Reference Books:

6. Design of Steel Structures, Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer, Tata McGraw-HillEducation pvt. Ltd,2nd Edition, 2012.

Note: IS: 800–2007, IS:875 are provided during the examination

GROUND WATER HYDROLOGY (PE2)

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226122	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand different types of aquifers and their characteristics.
2. Analysis the pumping test data for different aquifers
3. Distinguish the surface and subsurface investigation methods of ground water.
4. Discuss the methods of artificial recharging of ground water.
5. Evaluation and control of saline water intrusion.

Syllabus

UNIT-I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system.

UNIT-II

Ground water flow contours their applications: Analysis of Pumping Test Data – I: Steady flow groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests.

UNIT-III

Unsteady flow analysis: Pumping Test Data – II: Unsteady flow towards a well – Non equilibrium Equations – Thesis solution – Jocob and Chow's simplifications, Leak aquifers. Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic Refraction methods. Subsurface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT-IV

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, Relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground Water along with Case studies.

UNIT-V

Salin e Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg Relation, Shape of interface, control of seawater intrusion. Groundwater Basin Management: Concepts of conjunction use, Case studies.

Textbooks:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York 2004.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.(1983)

Reference Books:

1. Groundwater by Bawvwr, John Wiley & sons.
2. Groundwater System Planning & Management – R.Willes & W.W.G.Yeh, Printice Hall (1987)

GROUND IMPROVEMENT TECHNIQUES (PE2)

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226123	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Illustrate the several Ground modification mechanisms
2. Illustrate the Ground Improvement Techniques through mechanical approach.
3. Identify the different Hydraulic ground improvement techniques through dewatering techniques.
4. Explain the quick settlement techniques through chemical and physical modification.
5. Distinguish the inclusion and confinement techniques of ground improvement.

Syllabus

UNIT-I

Introduction to engineering ground modification: Need for Ground Improvement Techniques, Traditional Objectives and Emerging Trends, Identification of soil types, In situ and laboratory tests to characterize problematic soils, Classification of Ground Improvement techniques, Suitability, Feasibility, and Desirability.

UNIT-II

Mechanical Modification: Principles of soil densification –Moisture Content, Compactive Effort, Soil type and Preparation, Properties of Compacted soil, Compaction control tests, Specification of compaction requirements in terms of water content and Density, Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT-III

Hydraulic Modification: Objectives and techniques, Methods of dewatering- sumps and interceptor ditches- single, multi stage well points, vacuum well points, Horizontal wells, Filtration, Drainage and seepage control with Geosythetics, Preloading and vertical drains, Electro-kinetic dewatering by Electro-osmosis.

UNIT-IV

Physical and Chemical Modification: Methods of stabilization, cement, lime, bituminous, chemical stabilization with calcium chloride, sodium silicate and gypsum. Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

UNIT-V

Salin e Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg

Modification by Inclusions and Confinement: Soil Reinforcement, Reinforcement with strip, bar, mesh, sheet and grid reinforced soil. In-situ ground reinforcement, Ground Anchors, Types of ground anchors, Rock bolting and Soil nailing.

Textbooks:

1. 1. Engineering Principles of Ground Modifications, Hausmann, M. R., McGraw Hill publication, Indian Edition 1990.
2. Ground Improvement Techniques, Dr. P. Purushothama Raj, Laxmi publication, 3rd Edition, 2016.

Reference Books:

1. *1.* Designing with Geosynthetics, Koerner R. M, Prentice Hall, New Jersey, 5th Edition,1994.
2. Earth Reinforcement and soil structures, Jones C. J. F. P, Butterworths, London, revised subsequent Edition, 2013.

FINITE ELEMENT METHOD (PE2)

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226124	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Explain plane stress-plane strain equations and develop displacement functions.
2. Analyze one-dimensional problems using stiffness matrix.
3. Examine the different elements based on continuity and compatibility.
4. Illustrate quadrilateral elements using nodal points and shape functions.
5. Discuss the solution techniques for static condition.

Syllabus

UNIT-I

Introduction to Finite Element Method: Basic Equations in Elasticity Coordinate system – Natural, Global Coordinate System Coordinates. Stress – Strain equation – concept of plane stress – plane strain advantages and disadvantages of FEM. Element shapes – nodes – nodal degree of freedom— strain displacement relations.

UNIT-II

One dimensional problem: Bar element – Shape functions, stiffness matrix Strain displacement matrix formulation, FEA Beam elements – stiffness matrix – shape function – Analysis of continuous beams – stress strain relation.

UNIT-III

Two dimensional problems: FEA Two dimessional problem – CST – LST element – shape function – stress – strain Relation, Lagrangian – serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element – shape functions.

UNIT-IV

Isoparametric formulation: Concepts of isoparametric elements for 2D analysis – 4 noded and 8 noded iso- parametric quadrilateral elements.

UNIT-V

Salin e Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

Textbooks:

1. Introduction to finite Elements in Engineering, Tirupathi R. Chandrupatla and Ashok D. Belegundu, Prentice Hall of India, 4th Edition, 2012.

Reference Books:

1. Finite Element Analysis, P. Seshu, PHI Learning Private Limited, 10th Edition ,2012.
2. Concepts and applications of Finite Element Analysis, Robert D & Cook et al., Wiley India Pvt. Ltd. 3rd Edition, 1988.

ENVIRONMENTAL ENGINEERING LAB

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226187	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand principles and their practical application in water treatment.
2. Determine physical, chemical and biological characteristics of water and wastewater.
3. Determine the optimum dose of coagulant.
4. Estimate the chloride, nitrate and iron content in water.
5. Summarize the solutions using titration, conductivity meter, pH meter, turbidity meter and DO meter.

List of experiments

1. Determination of pH and turbidity
2. Determination of Conductivity and total dissolved solids
3. Determination of Alkalinity and Acidity
4. Determination of Chlorides
5. Determination of Iron
6. Determination of Dissolved Oxygen
7. Determination of Nitrates
8. Determination of Optimum dose of Coagulant
9. Determination of Chlorine Demand
10. Determination of B.O.D
11. Determination of C.O.D
12. Presumptive Coliform test

COMPUTER AIDED DESIGN LAB

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226391	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Model the geometry of real-world structure
2. Represent the physical model of structural element/structure Perform analysis
3. Interpret from the Post processing results
4. Design the structural elements
5. To apply the Design specification as per IS Codes

List of experiments

1. Demonstration and explanation on basic commands used in Staad.pro
2. Analysis & Design of fixed & continuous beams using Staad.pro
3. Analysis and design of slab using Staad.pro
4. Analysis & Design of 2D frame using Staad.pro
5. Analysis & Design of space Frame subjected to DL & LL using Staad.pro
6. Analysis & Design of residential building subjected to all loads (DL,LL,WL,EQL)
7. Analysis & Design of Roof Trusses
8. Design and detailing of built up steel beam
9. Developing a design programme for retaining wall using EXCEL Spread Sheet
10. Detailing of RCC beam and RCC slab
11. Detailing of Steel built up compression member

Note: Drafting of all the exercises is to be carried out using commercially available designing software's

CONCRETE TECHNOLOGY & HIGHWAY MATERIALS LAB

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226188	L	T	P	C	CIE	SEE	Total
	0	0	2	1	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Examine the experimental strength of aggregate materials as per codal provisions.
2. Compute the properties of bituminous materials.
3. Determine the properties of cement by conducting the test.
4. Define the workability of fresh concrete by conducting tests.
5. Estimate the strength of hardened concrete by conducting destructive and non destructive testing.

List of experiments

1. Determine the Crushing & Impact value of given coarse aggregate sample.
2. Determine the Specific Gravity and water absorption for given sample of aggregates.
3. Determine Abrasion& Attrition value for given sample of aggregates.
4. Determine Flakiness and Elongation index for given sample of aggregates.
5. Determine the Consistency& Ductility of given Bitumen sample.
6. Determine the Softening point, Flash and Fire point of given Bitumen sample.
7. Determine the Fineness& Standard Consistency of the given cement sample.
8. Determine the Initial & Final setting time of the given cement sample.
9. Determine the Specific Gravity & Soundness of the given cement sample.
10. Determine the Young's Modulus and Compressive strength of given concrete & Cement mortar specimens.
11. Determine the Workability of given fresh concrete sample.
12. Determination of Bulking percentage of given Fine Aggregate sample

Note: Drafting of all the exercises is to be carried out using commercially available designing software's

INDUSTRIAL ORIENTED MINI PROJECT

Department of Civil Engineering					III B.Tech II Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A2261P1	**L**	**T**	**P**	**C**	CIE	SEE	Total
	0	**0**	**4**	**2**			**100**

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Interpret the literature and develop solutions for framing problem statement.
2. Select software techniques for identifying problems.
3. Analysis and test the modules of planned project.
4. Design technical report and deliver presentations.
5. Apply engineering and management principles to achieve project goals.

Content

There shall be an industry-oriented Mini-Project, in collaboration with an industry of department specific specialization, to be taken up during the summer vacation after III year II Semester examination. The industry oriented mini-project shall be submitted in a report form and presented before the committee. The committee consists of an Internal/External examiner, Head of the Department, the Supervisor of the Mini-project and a Senior Faculty member of the department. There shall be no internal marks for industry oriented mini-project.

GENDER SENSITIZATION

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226019	L	T	P	C	CIE	SEE	Total
	2	0	0	0	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

4. Students will have developed a better understanding of important issues related to gender in contemporary India.
5. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
6. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
7. Men and women, students and professionals will be better equipped to work and live together as equals.
8. Students will develop a sense of appreciation of women in all walks of life through social media and literature.

Syllabus

UNIT-I

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men-Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT-II

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

UNIT-III

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and unaccounted work.-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT-IV

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT-V

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature-Gender Development Issues-Gender Issues- Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

Textbooks:

1. ***"Towards a World of Equals: A Bilingual Textbook on Gender"*** written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**,Telangana State in the year **2015**.

Reference Books:

4. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "*I Fought For My Life…and Won*."Available online at:
http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

IV Year I Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	PC	A227128	Quantity Survey & Valuation	3	0	0	3
2.	PC	A227129	Highway Engineering	3	0	0	3
3.	PE	A227130 A227131 A227132	Professional Elective – III 1. Pre stressed Concrete Design 2. Earthquake Engineering 3. Solid And Hazardous Waste Management	3	0	0	3
4.	PE	A227133 A227134 A227135	Professional Elective – IV 1. Railway & Airport Engineering 2. River Engineering 3. Advanced Structural Design	3	0	0	3
5.	OE		Open Elective – III	3	0	0	3
6.	PW	A2271PS1	Project Stage - I	0	0	6	3
7.	PC	A227189	Computational Laboratory	0	0	4	2
Total				**15**	**0**	**10**	**20**

IV Year II Semester

S. No	Course Category	Course Code	Course Title	L	T	P	Credits
1.	PC	A228139	Rehabilitation & Retrofitting of Structures	3	0	0	3
2.	PC	A228140	Remote Sensing & GIS	3	0	0	3
3.	PC	A228141	Construction Engineering & Management	3	0	0	3
4.	PW	A2281PS2/ A2281TS	Project Stage – II Including Seminar	0	0	22	9+2
Total				**9**	**0**	**22**	**20**

QUANTITY SURVEY & VALUATION

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227128	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

6 Summarize the basic principles and standard methods for working out quantities in estimating.
7. Determine the earthwork estimate of buildings, roads and canals.
8. Estimate the rate analysis of the various items of work.
9. Understand the process of contracting for roads and buildings.
10. Evaluate the valuation of buildings and provide practical knowledge of standard specifications of items of building construction.

Syllabus

UNIT-I

Introduction: General items of work in Building, Standard Unit Principles of working out quantities for detailed and abstract estimates – Approximate and Detailed Estimate of Buildings. Principles of bar bending (introduction)

UNIT-II

Earthwork Estimation: Methods of estimation of buildings and roads. Canals in cutting.

UNIT-III

Rate Analysis: Unit rate analysis for various items of building works.

UNIT-IV

Contracts: Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT-V

Valuation of buildings: Standard specifications for different items of building construction.

Textbooks:

1. Estimating and Costing, B.N. Dutta, UBS publishers, 27th Edition, 2016.

Reference Books:

1. Estimation, Costing and Specifications, M. Chakraborthi, Laxmi publications, 24th Edition, 2006.
2. Standard schedule of rates and standard data book, public works department.

HIGHWAY ENGINEERING

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227129	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Summarize the road developments in India from different periods.
2. Apply the concept of geometric design in real time engineering.
3. Make use of parameters related to traffic studies.
4. Design & model the intersections with specific standards.
5. Evaluate the different pavement design methods using IRC standards.

Syllabus

UNIT-I

Highway development and planning: Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports – Highway Project.

UNIT-II

Highway geometric design: Importance of Geometric Design - Design controls and Criteria - Highway Cross Section Elements - Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT-III

Traffic engineering & regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies-Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – On street& Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT-IV

Intersection design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

UNIT-V

Pavement Design: Factors affecting design**,** Highway Materials Introduction, Characteristics of highway materials, Design of Pavements- Design of Flexible pavement by CBR method as per IRC 37-2012 and theory of empirical mechanistic method. Design of rigid pavements as per IRC 58-2015,Stresses in rigid pavement by westergards and IRC methods.

Textbooks:

1. Highway Engineering, S.K.Khanna & C.E.G. Justo, Nemchand & Bros., 7th Edition, 2000.

Reference Books:

1. Principles of Traffic and Highway Engineering, Nicholas. J. Garber & Lester A. Hoel, Cengage Learning,5th Edition,
2. Principles and Practices of Highway Engineering, Dr. L.R. Kadiyali and Dr. N. Blal, Khanna Publications,1st Edition, 2005.
3. Traffic Engineering & Transportation Planning, Dr. L. R. Kadyali, Khanna Publications, 6th Edition, 1997

PRESTRESSED CONCRETE DESIGN (PE3)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227130	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Classify the concepts, principles, types and methods of PSC structures.
2. Evaluate the losses of PSC structures.
3. Analysis and design of PSC slabs and beams using IS:1343 (2012).
4. Explain transmission of prestressing force, end block analysis by different methods.
5. Analyze the stress distribution of composite beams and asses the deflection of beams..

Syllabus

UNIT-I

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

Methods and Systems of pre stressing: Pretensioning and Post tensioning methods and systems of prestressing like Hoyer system, MagnelBlaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT-II

Losses of Prestress: Loss of prestress in pre tensioned and post tesnioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT-III

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC slabs and beams of rectangular and I sections.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- IS Code provisions**.**

UNIT-IV

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zienlinski and Rowe's methods – Anchorage zone reinforcement- IS Provisions.

UNIT-V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long time deflections- IS code requirements.

Textbooks:

1. Prestressed concrete, N. Krishna Raju, Tata Mc Graw Hill Book Education pvt.ltd, 5th Edition, 2010.
2. Prestressed Concrete, N. Rajagopalan, Narosa Publishing House, 1st Edition,2014.

Reference Books:

1. Design of prestress concrete structures, T.Y. Lin and Burn, John Wiley, New York,1st Edition, 2010.
2. Prestressed concrete, S. Ramamrutham, Dhanpat Rai & Sons, Delhi,2nd Edition, 2010.

EARTHQUAKE ENGINEERING (PE3)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227131	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Quantify mechanical behaviour of earth's surface, seismic hazards and its effects.
2. Identify, formulate and solves engineering problems subjected to dynamic loading conditions
3. Understand the internal parameters of the structures for seismic design source.
4. Assess the design component or process to meet desired needs within realistic constraints.
5. Analyze and design the members for earthquake resisting parameters.

Syllabus

UNIT-I

Engineering Seismology: Earthquake phenomenon cause of earthquakes – Faults – Plate tectonics – Seismic waves – Terms associated with earthquakes – Magnitude/Intensity of an earthquake – scales – Energy released – Earthquake measuring instruments – Seismoscope, Seismograph, accelerograph – strong ground motions – Seismic zones of India.

UNIT-II

Theory of Vibrations: Elements of a vibratory system – Degrees of Freedom – Continuous system – Lumped mass idealization – Oscillatory motion – Simple Harmonic Motion – Free vibration of single degree of freedom (SDOF) system – undamped and damped – critical damping – Logarithmic decrement – Forced vibrations – Harmonic excitation – Dynamic magnification factor.

UNIT-III

Conceptual design: Building configurations – Introduction – Functional planning – Continuous load path – Overall form – simplicity and symmetry – elongated shapes – stiffness and strength – Horizontal and Vertical members – Twisting of buildings – Ductility – definition – ductility relationships – flexible buildings – framing systems – choice of construction materials – unconfined concrete – confined concrete – masonry – reinforcing steel.

UNIT-IV

Introduction to earthquake resistant design: Seismic design requirements – regular and irregular configurations – basic assumptions – design earthquake loads – basic load combinations – permissible stresses – seismic methods of analysis – factors in seismic analysis – equivalent lateral force method.

UNIT-V

Seismic Analysis of structures: Principles of earthquake resistant design of RC members – Structural models for frame buildings – Equivalent static analysis of any typical structure.

Textbooks:

1. Earthquake Resistant Design of structures, S. K. Duggal, Oxford University Press, 2nd Edition, 2007.
2. Earthquake Resistant Design of structures, Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd, 1st Edition,2016.

Reference Books:

1. Seismic Design of Reinforced Concrete and Masonry Building, T. Paulay and M.J.N. Priestly, John Wiley & Sons, 1st Edition,1994.
2. Eartquake Resistant Design of Buidling structures, Vinod Hosur, Wiley India Pvt. Ltd, 3rd Edition, 1992.

IS Codes

1. IS: 1893 (Part-1) -2002. "Criteria for Earthquake Resistant – Design of structures." B.I.S., New Delhi.

2. IS:4326-1993, " Earthquake Resistant Design and Construction of Building", Code of Practice B.I.S., New Delhi.
3. IS:13920-1993, " Ductile detailing of concrete structures subjected to seismic force" – Guidelines, B.I.S., New Delhi.

SOLID HAZARDOUS WASTE MANAGEMENT (PE-3)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227132	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Identify characteristics of solid waste, collection systems as per legislations.
2. List out waste reduction methods, collection techniques, resource recovery/recycling, energy recovery, transport & disposal options and select appropriate waste management facility.
3. Identify sources of hazardous waste; assess handling & storage methods based on regulations.
4. Select the site for disposal of hazardous waste; suggest treatment technologies and remediation measures for disposal sites.
5. Understand the concepts of Environmental Audit, toxicology principles; apply legislations of hazardous waste management.

Syllabus

UNIT-I

Solid wastes: Solid waste generation in a technological society, sources and types of solid waste, legislations on management and handling of municipal solid wastes, monitoring responsibilities; Collection of Solid Waste: type of waste collection systems, analysis of collection system, alternative techniques for collection system.

UNIT-II

Management of Solid waste: Separation, Processing and Transformation of Solid Waste: unit operations used for separation and processing, materials recovery facilities, waste transformation through combustion and anaerobic composting, anaerobic methods for materials recovery and treatment; Energy recovery - Incinerators. **Transfer and Transport:** need for transfer operation, well injections; Landfills: Site selection, drainage and leachate collection systems, requirements and technical solutions, integrated waste management facilities.

UNIT-III

Hazardous waste: Definition and identification of hazardous wastes, sources and characteristics, hazardous wastes in Municipal Waste, Hazardous waste regulations, minimization of Hazardous Waste, compatibility, handling and storage of hazardous waste, collection and transport.

UNIT-IV

Hazardous waste management: Treatment technologies, physical, chemical and biological treatment, Hazardous waste landfills: Site selection, remediation of hazardous waste disposal sites, quantitative risk assessment, containment, remedial alternatives.

UNIT-V

Environmental regulations: Environmental audit, pollution prevention, facility development and operation. Hazardous waste legislations, RCRA process, superfund process; toxicological principles, dose response, toxic effects, toxic response.

Textbooks:

1. P. A. Vesilind, Worrell W and Reinhart, “Solid Waste Engineering”, 2nd Edition (2016), Cengage Learning India Pvt. Ltd.

Reference Books:

1. Charles A. Wentz; “Hazardous Waste Management”, McGraw Hill Publication, 1995.

RAILWAY & AIRPORT ENGINEERING (PE-4)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227133	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Define and understand the various components of railways.
2. Understand and solve the geometric elements needed for the design of permanent way.
3. Define, understand, and design the various components of the airport.
4. Define, understand the planning and requirements of a harbor.
5. Improve and Visualize the working of intelligent transportation system.

Syllabus

UNIT-I

Introduction to railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT-II

Geometric design of railway track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT-III

Airport engineering: Airport Site selection – Runway Orientation – Basic, Runway Length – Corrections for Elevation– Airport Classification - Runway Geometric design concepts – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT-IV

Air Traffic Management: Visual aids-airport marking, airport lighting, air traffic control– need of air traffic control, concepts of air traffic control network, air communication, air traffic control aids, ILS and installations, landing aids, airport drainage system– special requirements of airport drainage system, design procedures for surface and sub– surface drainage systems.

UNIT-V

Intelligent transport systems: ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications, ITS architecture components and standards, Overview of ITS implementations in developed countries.

Textbooks:

1. Highway, railway, Airport and Harbour Engineering, K.P. Subramanian, Scitech publication, 1st Edition 2010.
2. A Text book of Transportation Engineering, S.P. Chandola, S.Chand & Co. Ltd, 1st Edition, 2001.

Reference Books:

1. A Text Book of Railway Engineering, S.C.Saxena and S.Arora, Dhanpatrai and Sons,7th Edition, 2013.
2. Transportation Engineering and planning, C.S. Papacostas, P. Prevedouros, 3rd Edition, 2000. Intelligent Transportation system, Pradeep kumar Sarkar, Amit Kumar Jain PHI learning , 1st Edition,

RIVER ENGINEERING (PE-4)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A227134	**L**	**T**	**P**	**C**	CIE	SEE	Total
	3	**0**	**0**	**3**	**40**	**60**	**100**

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Define basic terms and understand the concepts of river morphology.
2. Determine scour depth of hydraulic structure and identify methods of stage measurement.
3. Understand hydraulic river models.
4. Identify the river training works and understand protective measures
5. Design flood protection structure

Syllabus

UNIT-I

River morphology: Behavior of river flow, role of sediments in rivers, changes in regimes. Sediment transport mechanics - bed forms, bed load transport, and transport of suspended sediment, critical shear stress, and sediment transport equations.

UNIT-II

Aggradations and Degradation: Local scour at bridge piers and other hydraulic structures, measurements in rivers - stage measurements, channel geometry, discharge, and sediment samplers and suspended and bed load measurement.

UNIT-III

Hydraulic modeling of rivers: Hydraulic similitude, physical river models-fixed and movable bed models; sectional models, distorted models, mathematical models for aggradations, degradation and local scour.

UNIT-IV

River Protection and Training Works: Introduction, classification of river training, types of training works, protection for revetments, dikes, gabions, spurs, bank protective measures and bed control structures.

UNIT-V

Design of river flood protection structures: Diversion and cofferdam, river regulations systems, dredging and disposal, river restoration.

Textbooks:

1. P.Y.Julien,"River Mechanics", Cambridge University Press, March 2018
2. S. K. Garg, "Irrigation Engineering and Hydraulic Structures", Khanna Publishers, 2017

Reference Books:

1. R.J. Gardeand K.G. Ranga Raju, "Mechanics of sediment transportation and Alluvial stream problems", Wiley Eastern limited, 1977
2. Central Board Of Irrigation And Power, "River Behavior Management and Training (Vol.I&II)", New Delhi,1991

ADVANCED STRUCTURAL DESIGN (PE4)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227135	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Analyze and design of cantilever retaining wall.
2. Apply the provision of IS : 3370-2009 to design water tank.
3. Compile the design aspects of flat slabs.
4. Adapt the provision of IRC 21-1987 to class AA loading to design T beam girder.
5. Summarize the force components and design principles of RCC Chimney.

Syllabus

UNIT-I

Design of Retaining walls: Types of retaining walls, forces on cantilever retaining wall, stability conditions of a cantilever retaining wall, proportioning of cantilever retaining wall, Introduction to counter fort retaining wall

UNIT-II

Design of water tank: Design philosophy and requirements, I.S code recommendations regarding, Detailing in water tank, Design of circular water tank resting on ground (approximate method),I.S code method for design of circular tank, Design of elevated tank with staging

UNIT-III

Design of flat slab: Introduction terminology related with flat slab construction, I.S code provision for flat slab, Analysis and design of flat slab by direct design method, Shear in flat slab, openings in flat slab

UNIT-IV

Design of simple concrete bridges: IRC loading, Design of R.C slab culvert, Design of T-beam Girder Bridge

UNIT-V

Chimneys: Different components of Chimney, Design of RCC chimney

Textbooks:

1. Reinforced Concrete Structures vol II, B.C. Punmia, Ashok Kumar Jain, and Arun Kumar Jain, Lakshmi Publications Pvt. Ltd, 5th Edition, 2015.
2. Reinforced cement concrete design, Neelam Sharma , S.K. Kataria & sons Publication, revised Edition, 2020.
3. Advanced Reinforced Concrete Structures, N. Krishna Raju., 4th Edition, 2019

Reference Books:

1. Advanced Reinforced Concrete Structures, Varghese, Pranties hall of India pvt ltd,2nd Edition, 2010.
2. Essentials of Bridge Engineering, DeJohn son Victor, Oxford, and IBM publication co pvt ltd, 6th Edition, 2007.

PROJECT: STAGE -1

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A2271PS1	**L**	**T**	**P**	**C**	CIE	SEE	Total
	0	**0**	**6**	**3**	**40**	**60**	**100**

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Identify the domain of one's interest through critical review of literature.
2. Define a problem in the domain of interest and understand its scope and also develop the skill of coordinating with the team in the form of discussions during the progress of finding the solution.
3. Examine various approaches and build a preliminary approach to the problem on chosen topic.
4. Defend their approach by healthy interactions with the participants and modify, if necessary and cultivate the culture of ethical practices.
5. Develop the technical skill in preparing a well structured report and present.

Content

The objective of Project Part -1 is to enable the student take up investigative study in the broad field of Engineering / Technology, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a supervisor. This is expected to provide a good initiation for the student(s) towards R&D.

The work shall include:

1. Survey and study of published literature on the assigned topic
2. Working out a preliminary Approach to the Problem relating to the assigned topic
3. Conducting preliminary Analysis/Modeling/Simulation/Experiment/ Design/Feasibility
4. Preparing a Written Report on the Study conducted for Presentation to the Department
5. Final Seminar, as oral Presentation before a departmental Committee.

COMPUTATIONAL LABORATORY

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A227189	**L**	**T**	**P**	**C**	CIE	SEE	Total
	0	**0**	**4**	**2**	**40**	**60**	**100**

Course Outcomes:

After learning the contents of this course, the students must able to:

5. Inculcate with the usage of recent software's and its applications in the field of civilEngineering
6. Analyze the retaining wall and footing using software.
7. Assess the pile settlement.
8. Interpret the slope stability by using Geo5.
9. To understand the discharge analysis for river

List of Experiments

Demonstration of administrator settings of Geo5 software
2. Analysis of slope stability with homogeneous and stratified soil condition using Geostudio/Geo5 software
3. Stability of slope with retaining wall using Geo5 software
4. Settlement analysis of spread footing using Geo5 software
5. Analysis of single pile settlement using Geo5 software
6. Embankment analysis using Geo5 software
7. Introduction to Geo- FEM using Geo5 software
8. Introduction to QGIS software.
9. The features of a map using point, line & polygon features.(marketing hospitals, bus stops, rivers and roads, buildings, water bodies etc) using QGIS
10. Generating a Land use & Land- cover map using given data using QGIS.
11. Introduction to HEC-RAS software
12. Analysis of discharge from various cross-sections of a river (modify the river course) using

List of Software Required

6. QGIS (Open source)
7. HEC-RAS (Open source)
8. Geo5- Student's Version

REHABILITATION AND RETROFITTING OF STRUCTURES

Department of Civil Engineering					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A228139	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Illustrate the importance of inspection and maintenance.
2. Summarize the Impacts of corrosion and fire damage on structures.
3. Identify the damage assessment and testing of structural components.
4. Understand the materials and techniques needed for repairs.
5. Examine the failures of the structures and health monitoring with Optimization techniques.

Syllabus

UNIT-I

Introduction: Maintenance, Repair and Rehabilitation – Types Of Maintenance –Deterioration of structures – Distressin structures – causes and prevention. Mechanism of Damage – Types of Damage.

UNIT-II

Corrosion of steel Reinforcement: Causes – Mechanism and prevention. Damage of structure due to fire–fire rating ofstructures- Phenomena of Desiccation

UNIT-III

Inspection and Testing: symptoms and diagnosis of distress – Damage assessment – NDT

UNIT-IV

Repair of structure: common types of repairs – repair in concrete structures – repairs in underwater structures- Guniting – short create – Underpinning. Strengthening methods. Retrofitting – jacketing

UNIT-V

Health monitoring: structures and its health – use of sensors – building instrumentation.

Textbooks:

1. Maintenance and repair of civil structures, B.L. Gupta and Amit Gupta, Standard publications, 1st Edition 2007.
2. Concrete Technology, A.R. Shantha Kumar, Oxford university Press, New Delhi,1st Edition, 2010.

Reference Books:

1. Repair and Rehabilitation of Concrete Structures, Poonam I. Modi, Chirag N. Patel, PHI Learning Pvt. Ltd.

REMOTE SENSING AND GIS

Department of Civil Engineering					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A228140	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand the concepts of Photogrammetry and compute the heights of the objects using parallax.
2. Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies.
3. Understand the basic concept of GIS and its applications; know different types of data representation in GIS.
4. Illustrate spatial and non-spatial data features in GIS and understand the map projections and coordinates systems.
5. Remote sensing gives the provision of understanding about water resources management and monitoring.

Syllabus

UNIT-I

Introduction to Photogrammetry

Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

UNIT-II

Remote Sensing – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

Remote Sensing – II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT-III

Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT-IV

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT-V

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

Water Resources Applications – II: Reservoir sedimentation, Fluvial Geomorphology, water resources managementand monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

Textbooks:

1. Remote Sensing and its applications, L R A Narayana, University Press, 1999.
2. Principles of Geo physical Information Systems, Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers2004.

Reference Books:

1. Concepts & Techniques of GIS, C.P. Lo, Albert K.W. Yeung, Prentice Hall Publications, 2007.
2. Remote Sensing and Geographical Information systems, M. Anji Reddy, B.S. Publications, 2001.
3. Introduction to Geographical Information Systems, Kang – Tsung Chang, TMH Publications & Co. 4th Edition,2007.

CONSTRUCTION ENGINEERING & MANAGEMENT

Department of Civil Engineering					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A228141	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand the behavioral aspect of entrepreneurs, various approaches of time management, their strength and weakness.
2. Apply the concepts of project management Techniques.
3. Analysis various materials and equipments for construction work.
4. Examine on different types of contracts and specifications.
5. Outline the labour regulations and safety in construction.

Syllabus

UNIT-I

Management Techniques: Roles, Management theories, Social responsibilities, planning and strategic management, Strategy implementation, Decision making tools and techniques – Organizational structure, Human resource management – motivation performance – leadership.

UNIT-II

Management Applications: Classification of Construction projects, Construction stages, Resources – Functions of Construction Management and its Applications. Preliminary Planning – Collection of Data – Contract Planning – Scientific Methods of Management: Network Techniques in construction management – Bar chart, Gant chart, CPM, PERT, Cost & Time optimization.

UNIT-III

Resource Management: Resource planning – planning for manpower, materials, costs, equipment. Labour, Scheduling, Forms of scheduling – Resource allocation, Budget and budgetary control methods

UNIT-IV

Contracts and Tenders: Contract – types of contract, contract document, specification, important conditions of contract – tender and tender document – Deposits by the contractor – Arbitration, Negotiation – M.Book – Muster roll

UNIT-V

Management Information System: Labour Regulations: Social Security – welfare Legislation – Laws relating to Wages, Bonus and Industrial disputes, Labour Administration – Insurance and Safety Regulations, Workmen's Compensation Act – other labour Laws – Safety in construction, legal and financial aspects of accidents in construction, occupational and safety hazard assessment, Human factors in safety.

Textbooks:

1. Construction Planning and Management, P.S. Gahlot & B.M. Dhir, Wiley Eastern Limited, 2nd Edition,2018.
2. Construction Project Management, Chitkara K.K, Tata McGraw Hill Publishing Co, 4th Edition, 2019.
3. Management Theory and practice, VSP Rao, Excel Books, 2008.

Reference Books:

1. Estimation, costing, specification and valuation in civil engineering, M. Chakraborti, 18th Edition, 2006.

PROJECT: STAGE –II INCLUDING SEMINAR

Department of Civil Engineering					IV B.Tech II Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A2281PS2/ A2281TS	**L**	**T**	**P**	**C**	CIE	SEE	Total
	0	**0**	**22**	**9+2**	**40**	**60**	**100**

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Examine the chosen problem with a deeper insight and identify a path to problem solving while developing the skill of coordinating with the team.
2. Develop and demonstrate problem solving skills through detailed Analysis/ Modeling / Simulation/ Experimental works.
3. Evaluate the results based on deeper studies and draw conclusions along with scope for further studies to facilitate continuous learning.
4. Develop the art of technical report writing by following ethical practices.
5. Defend the work through a well structured presentation.

Syllabus

The object of 'Project: Stage-2' is to enable the student extend further the investigative study taken up, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/ Industry.

This is expected to provide a good training for the student(s) in R&D work and technical leadership.

The assignment to normally include:

1. In depth study of the topic assigned.
2. Review and finalization of the Approach to the Problem relating to the assigned topic.
3. Preparing an Action Plan for conducting the investigation, including team work.
4. Detailed Analysis/Modeling/Simulation/Design/Problem Solving/ Experiment as needed.
5. Final development of product/process, testing, results, conclusions and future directions.
6. Preparing a paper for Conference presentation/ Publication in Journals, if possible.
7. Preparing a Dissertation in the standard format for being evaluated by the Department.
8. Final Seminar presentation before Departmental Committee.

OPEN ELECTIVES OFFERED BY CIVIL ENGINEERING DEPARTMENT

Category	Course Title
OE-1	1. Smart cities 2. Disaster Management
OE-2	1. Green building Technologies 2. Environmental Pollution & control methods 3. Construction Management
OE-3	1. Remote Sensing & GIS 2. Introduction to earthquake Engineering 3. Solid Waste Management

SMART CITIES (OE1)

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225117	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand the necessity of smart infrastructure and to promote cities that provide quality of life to citizens.
2. Explain technology-based solution on smart mobility.
3. Illustrate & introduce the smart and sustainable waste and water management for smart cities.
4. Apply Energy Efficient strategies in city
5. Evaluate economical models for smart infrastructure solution.

Syllabus

UNIT-I

Introduction: Introduction to smart cities (Def & Types), Sustainable Development & Cities, Need for smart city,Concept of smart cities, Smart city components and Categories, Potential locations, Physical infrastructure, social infrastructure, Smart City Mission.

UNIT-II

Smart Mobility: Objectives & Components of smart mobility, Emerging concepts & strategies,
ICT supported mobility systems in- Real time traffic Information system, Parking Information system, car bike sharing system, Modal split, Public Mobility – Vehicle & Transport solutions.

UNIT-III

Water & **Waste Management:** Functions & Objectives of smart water management, Smart water management solutions, benefits, Smart waste management objectives & Scope, Waste management Approaches, Smart waste management strategies – Smart Bins, Automated waste Collection system (AWCS), Swachh Bharat Mission

UNIT-IV

Energy management: Smart Energy Concept, Objectives & Elements, Strategies for smart Energy-Energy Efficient buildings & use of Renewable energy, smart Grid.

UNIT-V

Future scope for Smart Cities: Investment for Land, Power, Water, and Highway and Road/ Rail Connectivity, Fuel Pipe Lines, Smart Economics concept & benefits, Smart Governance Functions & Objectives, Smart Cities- Indian case studies

Textbooks:

1. Introduction to smart cities, P.P Anil kumar, First Edition,2019.
2. Smart City, Arun Firodia,Vishwesh Pavnaskar Foreword by Dr. Narayana Murthy,Vishwakarma publication, 1st Edition, 2015.

DISASTER MANAGEMENT (OE1)

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A225118	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understanding the various types of disaster and its effect.
2. Illustrate the aspects of Environmental impacts assessment (EIA).
3. Demonstrate assessment of risk mitigation.
4. Assess the functional impacts of disaster management.
5. Integrate the management cycle and risk reduction.

Syllabus

UNIT-I

Types Of Disasters:

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, Is, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.

UNIT-II

Environment And Disasters:

Environment, ecosystem and disasters. Climate change – issues and concerns. Industrial hazards and safety measures. Post disaster impact on environment. Impact of developmental projects on disaster risk. Aspects of environmental management for disaster risk reduction. Environmental Impact Assessment (EIA).

UNIT-III

Disaster Risk Mitigation:

Disaster risk assessment (Hazard-Vulnerability-Capacity analysis), Hazard mapping and forecasting. Principles and aspects of Disaster prevention Disaster mitigation Preparedness for damage mitigation and coping with disasters. Capacity building for disaster/damage mitigation (structural and non-structural measures). Contingency planning for damage mitigation of different hazards.

UNIT-IV

Disaster Management:

Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community – based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster responses; Police and other organizations.

UNIT-V

Planning For Disaster Rescue And Risk Reduction:

Community-hazard profile of the disaster site. DM cycle, Different phases of Disaster Management :Predisaster stage, Emergency stage, Post disaster stage. Implementation of different disaster management phase and Relief mechanism during different disaster stages including cyclones, earthquakes, fire accidents, Tsunami, landslides etc. Disaster Management Act (2005); Disaster Management Policy (2009);

Textbooks:

1. Disaster Mitigation: Experiences And Reflections, Pradeep Sahni, 1st Edition 2013.
2. Natural Hazards & Disasters, Donald Hyndman & David Hyndman, Cengage Learning, 1st Edition, 2009.

GREEN BUILDING TECHNOLOGIES (OE-2)

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A226125	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand the Green building concept and focus on approaches that make building sustainable.
2. Illustrate Green building assessment and accreditation system.
3. Able to apply low energy building strategies.
4. Assess the functional impacts of disaster management.
5. Classify the economic benefits of green buildings.

Syllabus

UNIT-I

Introduction: The shifting landscape of green buildings, The driving forces for sustainable construction, Ethics and sustainability, Basic Concepts and Vocabulary, Major Environmental and resource concerns. International Building Assessment systems.

UNIT-II

The green building assessment system: Structure of the LEED suite of Building rating systems, LEED Credentials, LEED Building Design and construction Rating system, Green Globes Building Rating Tools, Structure of Green Globes for New Construction, Green Globes Assessment and Certification Process, Green Globes Professional Credentials, IGBC Building design, Rating system and Professional credentials, Green Building Documentation Requirements

UNIT-III

Green building design: Conventional versus Green Building Systems, green materials, material selection criteria, Executing the Green Building Project, Integrated Design Process, Role of the charrette in the design process.

UNIT-IV

Low – energy building strategies: Building Energy Issues, High – Performance Building Energy Design Strategy, Passive Design Strategy, Building Envelope, Internal Load Reduction, Smart Buildings and Energy Management Systems.

UNIT-V

Green building economics and sustainable construction: General approach, The Business Case for High – Performance Green Buildings, Economics of Green Building, Quantifying Green Building Benefits, Articulating Performance Goals for Future Green Buildings.

Textbooks:

1. Sustainable Construction, CHARLES J. KIBERT, John Wiley& sons, 4th Edition,2016.
2. Sun, Wind & Light- Architectural design strategies, Mark Dekay & G.Z Brown, John Wiley & sons, 3rd Edition, 2014

Reference Books:

1. IGBC Reference manual (2016)

ENVIRONMENTAL POLLUTION & CONTROL METHODS (OE2)

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226126	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understanding about the various air pollutants and effect on environment.
2. Analyze quality of air in the form of air quality index and dispersion modeling.
3. Illustrate about water pollution and solid waste management.
4. Analysis and measurement of soil contamination.
5. Predict types of noise and problems arise due to noise pollution.

Syllabus

UNIT-I

Introduction to air pollution: Air and its composition, Air Pollution, Sources of air pollution and its classification, Major air Pollutants and their characteristics, Specific group pollutants such as CFC, GHG etc, Air Pollutants from various industrial sectors, Impact of air pollution on human health and vegetation.

UNIT-II

Air quality: Introduction to Air quality index and Comprehensive Environmental Pollution Index etc. and its application, Sampling and measurement of air pollutants, Introduction to National Ambient Air Quality Standards.

Impacts of Air Pollution: Extreme air Pollution scenarios: Acid Rain, Global Warming, Smog, Ozone layer depletion etc.

UNIT-III

Water Pollution: Introduction to water pollution, sources of water pollution- Industrial, Agricultural, and Biomedical. Water Management and its Benefits, Impacts of water Pollution.

Solid waste Management- Introduction, Definition, Types of solid waste, Municipal Solid Waste management and Industrial Waste Management.

UNIT-IV

Soil pollution: Soil contamination by chemical pollutants, sources, Remediation by plants, bioremediation by microorganisms, contamination by inorganic (including heavy metals) and organic pollutants, factors affecting uptake of contaminants, prevention and elimination of contamination, landfills. Effects of atmospheric deposition on various types of soils, cation exchange capacity (CEC) of soils.

UNIT-V

Introduction to noise: Difference between sound and noise, Pitch and Frequency, Sound Pressure, Sound Pressure level (Decibel), and sources of noise and harmful effects of noise, noise measurement and noise control measures.

Textbooks:

1. Environmental Pollution Control and Engineering, Rao C.S., New Age International (P) Limited, 1st Edition, 1991.
2. Air Pollution, Perkin, H.G. McGraw Hill, 1st Edition, 1974.

CONSTRUCTION MANAGEMENT (OE 2)

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A226127	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Understand the construction management skills as a member of a multi- disciplinary team.
2. Apply to construction planning techniques.
3. Analyze construction documents for planning and management of construction processes.
4. Apply knowledge, techniques, skills, and tools of the construction industry in construction activities.
5. Understand the legal implications of contract, common, and regulatory law to manage a construction project

Syllabus

UNIT-I

CONSTRUCTION PLANNING AND MANAGEMENT: Significance of Construction Management, Objectives and Functions of Construction Management, Types of Construction, Resources for Construction Industry, Various stages in Construction, Construction Management Team & Types of Organization.

UNIT-II

PROJECT PLANNING: Project Planning Techniques, Planning of Manpower, Materials, Equipment and Finance, Scheduling by Bar Charts, Limitations of Bar Charts.

PERT&CPM: Significance of CPM&PERT Techniques in Construction Management, Project Scheduling, Network Analysis, Cost-Time Analysis in Network Planning, Float; Total float & free float.

UNIT-III

CONTRACT MANAGEMENT: Types of contracts, contract document, specification, important conditions of contract– tender and tender document–Deposits by the contractor

BIDDING: Definition and Process, Various steps in Bidding, M Book- MusterRoll

UNIT-IV

CLAIM MANAGEMENT: Construction claims, Source of claim, Claim Management, Disputes and Dispute resolution, Arbitration and its advantages, project closure, Construction closure, Contract closure.

UNIT-V

REGULATIONS AND SAFETY: Labour Regulations, Social Security – welfare legislation – Laws relating to Wages – Workmen's Compensation Act – Safety in Construction, legal and financial aspects of accidents in construction.

Textbooks:

1. Construction Planning and Management, P.S. Gahlot & B.M. Dhir, Wiley Eastern Limited, 2nd Edition,2018.
2. Construction Project Management, Chitkara K.K, Tata McGraw Hill Publishing Co, 4th Edition, 2019.

Reference Books :

1. Fundamentals of Management, Stephen A. Robbins & DavidA. Decenzo & Mary Coulter, 14th Edition, 2016.

REMOTE SENSING & GIS (OE3)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227136	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Select the type of remote sensing technique / data for required purpose.
2. Identify the earth surface features from satellite images.
3. Analyze the energy interactions in the atmosphere and earth surface features.
4. Prepare thematic maps.
5. Interpretations of satellite data for various applications.

Syllabus

UNIT-I

EMR and its interaction with atmosphere &Earth : Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan – Boltzmann and Wien's Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

UNIT-II

Platforms and sensors: Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and space borne TIR and microwave sensors.

UNIT-III

Image interpretation and analysis: Types of Data Products – types of image interpretation – basic elements of image interpretation – visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

UNIT-IV

Geographic information system: Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS software – Data type – Spatial and non-spatial (attribute) data – measurement scales – Data Base Management Systems (DBMS).

UNIT-V

Data entry, storage and analysis: Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

Textbooks:

1. Remote Sensing and Image Interpretation, Lille sand T.M., Kiefer, R.W. and J.W. Chipman, John Willey and Sons Asia Pvt. Ltd., 5th Edition, 2004.
2. Introduction to Geographical Information Systems, Kang – Tsung Chang, TMH Publications & Co. 4th Edition,2007.

Reference Books :

1. Remote sensing and Geographical information system, M. Anji Reddy, B.S. Publications, 4th Edition, 2001.
2. Basics of remote sensing & GIS, S. Kumar, Laxmi publications, 1st Edition, 2016.

INTRODUCTION TO EARTHQUAKE ENGINEERING (OE3)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227137	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

1. Select the type of remote sensing technique / data for required purpose.
2. Illustrate the plate tectonics plate and fault attenuation.
3. Evaluate the quantitative measure of energy release.
4. Compute the mechanical behavior of earth surface and its significance.
5. Classify different earthquake hazards and its effects.

Syllabus

UNIT-I

Introduction: Interior of the Earth – Earthquakes phenomenon causes of earthquake, Nature and Occurrence of earthquakes– effects of earthquakes, Consequences of Earthquake damage– Terms associated with earthquakes.

UNIT-II

Engineering Seismology: Elastic rebound theory, Plate tectonics; Different plate theories – lithospheric plates – plate margins & Earthquake occurrences - movement of plates, Faults &fault types, Earthquake classification

UNIT-III

Measurements of Earthquakes: Magnitude/Intensity of an earthquake – scales – Energy released – Earthquake measuring instruments – Seismoscope, Seismograph and accelerograph – Interpretation of Seismic Records. Seismic zones of India - Concept of seismic micro zonation.

UNIT-IV

Strong Ground Motion: Response of Structure to Earthquake Motion, Fundamentals of wave motion – seismic wave types. Reflection and refraction of plane waves at a plate boundary - boundary conditions, Energy conversions, focus on Indian earthquakes.

UNIT-V

Seismic Hazard: Introduction to Seismic Hazard, types of hazard, Time parameters of hazards, Local site effects and evaluation methods.

Concepts of Earthquake resistant building: Building configurations – Introduction – Functional planning – Continuous load path – Characteristics of Buildings.

Textbooks:

1. Earthquake Resistant Design of structures, Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd, 1st Edition, 2016.
2. Earthquake Resistant Design of structures, S. K. Duggal, Oxford University Press, 2nd Edition,2007.

Reference Books :

1. Introduction to Earthquake Engineering, Hector Estrada & Luke S Lee, CRC Press, Taylor & Francis Group, 3rd Edition, 2017.
2. Earthquake Resistant Design of Buidling structures, Vinod Hosur, Wiley India Pvt. Ltd, 3rd Edition,1992.
3. Earthquake Tips – Learning Earthquake Design and Construction, C.V.R. Murthy, 2005.

SOLID WASTE MANAGEMENT (OE3)

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A227138	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

After learning the contents of this course, the students must able to:

6. Illustrate the hierarchical structure in solid waste management and an integrated solution.
7. Apply the legal legislation, economic analysis of the solid waste management system.
8. Identity route optimization for a solid waste collection and transport system.
9. Understand legal and economical points related to general solid waste management.
10. Plan site selection for a landfill.

Syllabus

UNIT-I

Waste Management: Solid waste problem, meaning and definition of solid waste, concept and classification of municipal solid waste, Impacts of solid waste on environment.

UNIT-II

solid waste management rules and Regulations: Developing a solid waste collection and transfer system, characterizing waste generation, Determining public and private collection or transfer options.

UNIT-III

Waste management techniques: Solid waste management Hierarchy, waste prevention, definition of source reduction, waste reduction at source using 5R's Technique.

UNIT-IV

Waste disposal Techniques: Waste disposal, composting, principles of composting, factors affecting composting, vermi composting, waste to energy techniques, Landfill technique and design and operating procedure of landfill.

UNIT-V

Solid waste management of Biomedical waste, plastic and E-waste: Biomedical waste – sources and generation, biomedical waste management, plastic – Dangers of plastic wastes, Recycling and disposal of plastic wastes, E – wastes– Definition, Health hazards, E – waste management and conclusion.

Textbooks:

1. Solid waste Management, K. Sasi Kumar & S. Gopi Krishna, Prentice-Hall Publishers, 1st Edition, 2009.
2. Solid waste Management, Jagbir Singh & A.L. Ramanathan, I K International Publishing House Pvt Ltd, 1st Edition, 2009.

Reference Books :

1. Management of Municipal Solid waste, T.V. Ramachandra, The Energy and Resources Institute, TERI, 1st Edition, 2009.
2. Municipal Solid waste Management in India, Subhrabaran Das & KorobiGogoi, VDM Verlag Publisher, 1st Edition, 2010.
3. Handbook of Solid Waste Management, George Tchobanoglous and Frank Kreith, McGraw-HILL, 2nd Edition , 2002.

MINOR IN PLANNING & CONSTRUCTION

S. No	Year/ Semester	Course Code	Course Title	L	T	P	C
1.	III-I	A215M101	Principles of Surveying	3	0	0	3
2.	III-I	A215M181	Surveying Lab	0	0	3	1.5
3.	III-II	A216M102	Fundamentals of building planning	3	0	0	3
4.	III-II	A216M182	Computer aided Building planning Lab	0	0	3	1.5
5.	IV-I	A217M103	Civil Engineering materials	3	0	0	3
6.	IV-I	A217M104	Sustainable construction Practices	3	0	0	3
7.	IV-II	A218M105	Construction Management/ MOOCS	3	0	0	3
Total				**15**	**0**	**6**	**18**

PRINCIPLES OF SURVEYING

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A215M101	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Students will be able to perform a detailed surveying at any site by any method.
2. Ability to use modern survey equipment to measure angles and distances.
3. Ability to measure differences in elevation, draws and utilizes contour plots, and calculates volumes for earthwork.
4. Understand the working principles of modern equipment and its methodologies.
5. Analyze the basic concept of GPS and its applications.

Syllabus

UNIT-I

Introduction to surveying: Definition of surveying, objectives of surveying, principles and types (plane surveying and geodetic surveying), Scales (Plane, diagonal, chord, vernier, micro), Conventional Symbols and Signals.

UNIT-II

Distances and direction: Chain, Use of chain and tape, types of tapes(Linen, woven metallic, steel, synthetic, invar), corrections in tape, Compass and its types (prismatic and surveyors), meridians, azimuths and bearing, declination, computation of angle.

UNIT-III

Leveling and contouring: Level, types of levels (Dumpy, reversible, tilting, digital) and there parts, Temporary adjustments – method of leveling (Simple, differential, fly, profile, precise, reciprocal). Contours, Characteristics and Uses of contours

UNIT-IV

Modern field surveying systems: Electronic distance measurements, types of EDM instruments(Microwave instruments, Infrared wave instruments, Light wave instruments), total station – parts of a total station – accessories – advantages and applications, errors in total station survey.

UNIT-V

Introduction to Remote Sensing: Global positioning systems – segments, GPS measurements, errors in biases, surveying with GPS, Co-ordinate transformation, accuracy considerations, electromagnetic spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, Remote sensing data acquisition, platforms and sensors, visual image interpretation, digital image processing.

Textbooks:

1. Duggal S K, “Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.
2. AnjiReddy.M Remote sensing geographical Information system, B.S. publications, 2001.

Reference Textbooks:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press – 2012
Chandra A M, “Plane Surveying” and “Higher Surveying” New age International Pvt. Ltd., Publishers, New Delhi, 2002.
2. “Advanced Surveying Total Station GIS and Remote Sensing by SatheeshGopi, R. Sathi Kumar and N.Madhu. Pearson Education India, 2007.

SURVEYING LAB

Department of Civil Engineering					III B.Tech I Semester		
Course Code	**Hours/Week**			**Credits**	**Marks**		
A215M181	**L**	**T**	**P**	**C**	CIE	SEE	Total
	0	**0**	**3**	**1.5**	**40**	**60**	**100**

Course Outcomes:

10. Students will be able to perform a detailed surveying at any site by any method.

2. Ability to use modern survey equipment to measure angles and distances.

3. Ability to measure differences in elevation, draws and utilizes contour plots, and calculates volumes for earthwork.

4. Understand the working principles of modern equipment and its methodologies.

5. Analyze the basic concept of GPS and its applications.

List of experiments

1. Survey of an area by chain surveying.
2. Determination of two inaccessible points by using prismatic compass.
3. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
4. An exercise on L.S, C.S and Plotting
5. Trigonometric leveling – Heights and distance problem
6. Determination of Area & Remote height using total station
7. Traversing & Contouring using total station
8. Distance, gradient, Diff. height between two inaccessible points using total station
9. Study on use of GPS for data collection
10. Collection of Point Data, Line Data, and Polygon Data using GPS.

FUNDAMENTALS OF BUILDING PLANNING

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A216M102	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Identify various building components, conventional signs and symbols Ability to use modern survey equipment to measure angles and distances.
2. Illustrate the building bye-laws and the principles of planning.
3. Understand about the building services and safety.
4. Design and Sketch the plans of various types of buildings and detailing of doors, windows, etc.
5. Understand the elements of perspective drawing involving simple problems

Syllabus

UNIT-I

Basic components of buildings: Various components of building like various types of footing (isolated & pile), various types of door, window, and ventilators, lintels and arches, stairs and staircase, trusses, flooring, roofs etc and its applications in building planning.

UNIT-II

Building planning: provision on national building code, building bye-laws, open area, setbacks, FAR terminology, principles of architectural composition (ie. Unity, contrast etc) , principles of planning.

UNIT-III

Building Services - Introduction of building services like water supply and drainage, electrification, ventilation and lighting and staircases, fire safety, thermal insulation, acoustics of buildings.

UNIT-IV

Design and Drawing of Building: Design and preparation of detailed drawings of various types of buildings like residential building, institutional buildings and commercial buildings, detailing of doors , windows, ventilators and staircases etc.

UNIT-V

Perspective Drawing: Elements of Perspective Drawing involving simple problems , one point and two point Perspectives, principles of energy efficient buildings

Textbooks:

1. Building Planning and Drawing, N Kumar swamy and Kameswar Rao, charator pubications, 7th Edition, 2015
2. Building planning, Design and scheduling, Gurucharan Singh Jagdish Singh 2nd edition, 2008.

Reference Textbooks:

1. Building drawing with an integrated approach to built environment , fourth edition, Shah , Kale &Patki,2002.

COMPUTER AIDED BUILDING PLANNING LAB

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A216M182	L	T	P	C	CIE	SEE	Total
	0	0	3	1.5	40	60	100

Course Outcomes:

1.Assess the Software with aiding source.
2.Draft the Plan and Elevation & Sectional views of the buildings.
3.Develop the components of the building.
4.Replicate the detailing of framed and Industrial structures.
5.Layout development as per the planning principles.

List of Experiments

1. Introduction to the basic commands of CAD software .
2. Practice exercises on basic commands of CAD software.
3. Detailing of different types (any 2 types) of doors and its components by using CAD
4. Detailing of different types (any 2 types) of windows and its components by using CAD
5. Drawing of single line plans Single storey buildings.
6. Drawing of plans of single storied buildings with Brick thickness.
7. Drawing of plans of multi storied buildings with Brick thickness (Max G+3).
8. Developing sections and elevations of Single storey buildings.
9. Detailed drawing of Roof trusses by using CAD.
10. Exercises on the development of working of building by using CAD (Layout development).

CIVIL ENGINEERING MATERIALS

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A217M103	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

9. Identify the suitable stones & bricks for constructions by evaluating the test results .
10. To understand the cement and its uses in constructions.
11. Understand the timber and its applications in construction practices
12. Study suitable type metals & paints.
13. Listing out the modern materials in general construction practice.

Syllabus

UNIT-I

Engineering Behavior of Materials: Some Fundamentals and Suitability of Construction materials: Introduction, Stress- Strain Relations and Constitutive Models, Special Loading Situations, Strain- Displacement Relations, Equations of Equilibrium, Suitable Development, Suitable of Construction Materials.

UNIT-II

Soils and Rocks: Civil Engineering Applications, Formation of Soils, Soils versus Other engineering Materials, Soil Classification, Rock Engineering Applications, Common Rocks in Construction, Rock Mass and Intact Rock, Strength and Stiffness of Intact Rocks.

UNIT-III

Aggregates and Geosynthetics: Origin, Geology and Classification of Parent Rocks, Properties and Testing of Aggregates, Uses of Aggregates, Types of Geosynthetics, Polymers Used, Manufacture, and Common Use, Selection of Geosynthetics.

UNIT-IV

Cement and Concrete: Introduction, Constituents of concrete, Different Stages of Concrete, Properties of Fresh Concrete, Site Practice of Concrete, Properties of Hardened Concrete.

UNIT-V

Metals and Alloys: Ferrous Alloys, Nonferrous Metals and Alloys, Types of Failures, Advantages of Steel, Limitations of Steel, Iron and Steel- making, Wrought Iron, Cast Iron, Carbon Steel, Structural Steel, Heat Treatment of Steel, Mechanical Properties of Steel .

Textbooks:

1. Civil Engineering Materials, N Sivakugan, C. T. Gnanendran, R. Tuladhar, M. Bobby Kannan, Cengage Learning, International Edition, 2018.

Reference Textbooks:

1. Building Materials, S. K. Duggal, New Age International, 4th Edition, 2010.
2. Building Materials, P.C. Varghese, PHI, 2nd Edition, 2015.

SUSTAINABLE CONSTRUCTION PRACTICES

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A217M104	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Understand the Green building concept and focus on approaches that makes building sustainable.
2. Illustrate Green building assessment and accreditation system.
3. Able to apply low energy building strategies.
4. Designing green building and improve sustainability of infrastructure.
5. Classify the economic benefits of green buildings.

Syllabus

UNIT-I

Introduction: The shifting landscape of Sustainable buildings, The driving forces for sustainable construction, Ethics and sustainability, Basic Concepts and Vocabulary, Major Environmental and resource concerns. International Building Assessment systems.

UNIT-II

Sustainable building strategies: Building Energy Issues, High – Performance Building Energy Design Strategy, Passive Design Strategy, Building Envelope, Internal Load Reduction, Smart Buildings and Energy Management Systems.

UNIT-III

The building assessment system: Structure of the LEED suite of Building rating systems, LEED Credentials, LEED Building Design and construction Rating system, Green Globes Building Rating Tools, Structure of Green Globes for New Construction, Green Globes Assessment and Certification Process, Green Globes Professional Credentials, IGBC Building design, Rating system and Professional credentials.

UNIT-IV

Sustainable Water and waste Management: strategies for suitable water management techniques for buildings, Sanitation-On-Site Sewage Treatment, Smart Solid Waste Management - Municipal Wet Waste Disposal.

UNIT-V

Building economics and sustainable construction: General approach, The Business Case for High – Performance sustainable Buildings, Economics of Building, Quantifying sustainable Building Benefits, Articulating Performance Goals for Future sustainable construction.

Textbooks:

1. Sustainable Construction, CHARLES J. KIBERT, John Wiley& sons,2016.
2. Sustainable Construction: Green Building Design and Delivery, Charles J. Kibert, John Wiley& sons, 2007.

CONSTRUCTION MANAGEMENT

Department of Civil Engineering					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A218M105	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Understand the behavioural aspect of entrepreneurs, various approaches of time management, their strength and weakness.
2. Apply the concepts of project management during the construction phase, project organization, project planning and control using CPM,PERT techniques.
3. Analysis various materials and equipment's for construction work.
4. Examine the on different types of contracts and specifications.
5. Outline the labour regulations and safety in construction.

Syllabus

UNIT-I

Management Techniques: Roles, Management theories, Social responsibilities, Planning and strategic management, Strategy implementation, Decision making tools and techniques – Organizational structure, Human resource management – motivation performance – leadership.

UNIT-II

Management Applications: Classification of Construction projects, Construction stages, Resources – Functions of Construction Management and its Applications. Preliminary Planning – Collection of Data – Contract Planning – Scientific Methods of Management: Network Techniques in construction management – Bar chart, Gant chart, CPM, PERT, Cost & Time optimization.

UNIT-III

Resource Management: Resource planning – planning for manpower, materials, costs, equipment. Labour, Scheduling, Forms of scheduling – Resource allocation, Budget and budgetary control methods.

UNIT-IV

Contracts and Tenders: Contract – types of contract, contract document, specification, important conditions of contract – tender and tender document – Deposits by the contractor – Arbitration, Negotiation – M.Book – Muster roll – stores.

UNIT-V

Management Information System: Labour Regulations: Social Security – welfare Legislation – Laws relating to Wages, Bonus and Industrial disputes, Labour Administration – Insurance and Safety Regulations, Workmen's Compensation Act – other labour Laws – Safety in construction, legal and financial aspects of accidents in construction, occupational and safety hazard assessment, Human factors in safety, legal and financial aspects of accidents in construction, Occupational and safety hazard assessment.

Textbooks:

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara,K.K., Construction Project Management¸ Tata McGraw Hill Publishing Co, Ltd., New Delhi,1998.

Reference Textbooks:

1. Construction Management And Planning by: sengupta, b.guha, h.tatamcgraw-hill publications,1995.

List of MOOCs courses on Swayam (NPTEL)

It is instructed that a student has to opt minimum 12 week online courses to earn the required credit.

1) Remote Sensing Essentials
2) Geographic Information Systems
3) Safety in Construction
4) Natural Hazards
5) Probability Methods in Civil Engineering
6) Urban Transportation Systems Planning
7) Introduction to Civil Engineering Profession
8) Urban Transportation Systems Planning
9) Architectural conservation and Historic preservation

COURSE STRUCTURE FOR B.TECH WITH HONORS PROGRAM

Honors in Structural Engineering

S. No	Year/ Semester	Course Code	Course Title	L	T	P	C
1.	III-I	A215M102	Advanced Reinforced concrete Design	3	0	0	3
2.	III-I	A215M182	Advanced Concrete Lab	0	0	3	1.5
3.	III-II	A216M103	Structural Dynamics	3	0	0	3
4.	III-II	A216M183	Computer aided structural design Lab	0	0	3	1.5
5.	IV-I	A217M104	Research Methodology	3	0	0	3
6.	IV-I	A217M105	Cost management of Engineering projects	3	0	0	3
7.	IV-II	A2181TPW	Technical Paper Writing	2	0	0	2
8.	IV-II	A218M106	Earthquake Resistant Design Of Buildings / one course from MOOCS	3	0	0	3
Total				**17**	**0**	**6**	**20**

ADVANCED REINFORCED CONCRETE DESIGN

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A215M102	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Understand the various design concepts of singly and doubly reinforced beam and draw the reinforcement details.
2. Design the beam under deflection and check the serviceability requirements for RC structural elements.
3. Analyze the rotation of RC members.
4. Design of different slabs with the reinforcement details
5. Explore the design concept of Corbels.

Syllabus

UNIT-I

Basic Design Concepts: Behaviour in flexure, Design of singly reinforced rectangular sections, Design of doubly reinforced rectangular sections, Design of flanged beams, Design of shear, Design for Torsion,

UNIT-II

Limit state of Serviceability**:** Deflections of Reinforced concrete beams and slabs, short term deflection and long term deflection, estimate on of crack width in RCC members, calculation of crack widths.

UNIT-III

Limit Analysis of R.C. Structures: Rotation of a plastic hinge, Redistribution of moments, moment rotation characteristics of RC member, I.S. code provisions, and applications for fixed and continuous beam.

UNIT-IV

Flat slabs: Direct design method – Distribution of moments in column strips and middle strip-moment and shear transfer from slabs to columns – Shear in Flat slabs – Check for one way and two way shears – Introduction to Equivalent frame method.

UNIT-V

Design of Reinforced Concrete Deep Beams & Corbels: Steps of Designing Deep Beams, Design by IS 456, Checking for Local Failures, Detailing of Deep Beams, Analysis of Forces in a Corbels , Design of Procedure of Corbels, Design of Nibs.

Textbooks:

1. Reinforced concrete design by S.Unnikrishna Pillai & Menon, Tata Mc. Graw Hill, 2nd Edition,2004.
2. Advanced Reinforced Concrete Design – P.C. Varghese, Prentice Hall of India, 2008.

Reference Textbooks:

1. Reinforced concrete design by Kennath Leet, Tata Mc.Graw-Hill International, editions, 2ndedition,1991.
2. Design of concrete structures – Arthus H. Nilson, David Darwin, and Chorles W. Dolar, Tata Mc. Graw-Hill, 3rd Edition, 2005.
3. Limit state theory and design of reinforced concrete by Dr. S.R. Karve and Dr. V.L. Shah, Standard Publishers, Pune, 3rd Edition, 1994.
4. IS **:** 456 **:** 2000, Code of Practice for Plane and Reinforced Cement Concrete,
5. SP 16, SP 34.

ADVANCED CONCRETE LABORATORY

Department of Civil Engineering					III B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
	L	T	P	C	CIE	SEE	Total
A215M182	0	0	3	1.5	40	60	100

Course Outcomes:

1. Understand the properties of the materials and the behavior of the concrete.
2. Draw the Gradation Charts of Aggregates
3. apply the knowledge to calculate workability and permeability of concrete
4. identify the air entrainment and curing of concrete
5. Explore different Chemical Admixtures on concrete.

List of Experiments

1. Tests on cement – Consistency, Setting time, Soundness, Compressive Strength.
2. Gradation Charts of Aggregates.
3. Bulking of fine Aggregate.
4. Aggregate Crushing and Impact value
5. Workability Tests on self compacting concrete
6. Air Entrainment Test on fresh concrete.
7. Marsh cone test.
8. Permeability of Concrete.
9. Non Destructive Testing of Concrete.
10. Accelerated Curing of Concrete.
11. Influence of W/C ratio on strength and Aggregate / Cement ratio on workability and Strength
12. Influence of Different Chemical Admixtures on concrete.

STRUCTURAL DYNAMICS

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A216M103	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Classify the concepts and principles of vibratory system .
2. Evaluate the Methods of discretization technique.
3. Analyze the Harmonic, Periodic, Impulsive and general dynamic loadings.
4. Explain the solutions of Eigen value problem.
5. Explore various types of Earthquake Response Systems.

Syllabus

UNIT-I

Theory of vibrations: Introduction – Elements of vibratory system – Degrees of Freedom – Continuous System – Lumped mass idealization – Oscillatory motion – Simple Harmonic motion – Vectorial representation of S.H.M – Free vibrations of single degree of freedom system – undamped and damped vibrations – critical damping – Logarithmic decrement – Forced vibration of SDOF systems – Harmonic excitation – Dynamic magnification factor – Phase angle – Band width.

UNIT-II

Introduction to Structural Dynamics: Fundamental objectives of dynamic analysis – Types of prescribed loading – Methods of discretization – Formulation of equations of motion by different methods – Direct equilibration using Newton's law of motion / D'Alembert's principle, Principle of virtual work and Hamilton principle.

UNIT-III

Single Degree of Freedom Systems: Formulation and solution of the equation of motion – Free vibration response – Response to Harmonic, Periodic, Impulsive and general dynamic loadings, Duhamel integral.

UNIT-IV

Multi Degree of Freedom Systems : Selection of the degrees of Freedom – Evaluation of structural property matrices – Formulation of the MDOF equations of motion – Undamped free vibrations – Solutions of Eigen value problem for natural frequencies and mode shapes – Analysis of Dynamic response – Normal co-ordinates – Uncoupled equations of motion – Orthogonal properties of normal modes – Mode superposition procedure.

UNIT-V

Deterministic Earthquake Response of Systems – Rigid Foundation, Types of Earthquake Excitation – Response to Rigid – Soil Excitation, Lumped SDOF elastic systems – Lumped SDOF elastic system – Distributed Parameter Elastic Systems – SRSS, CQC combination of modal responses.

Textbooks:

1. Structural Dynamics by Mario Paz, C.B.S Publishers, New Delhi
2. Dynamics of Structures by Clough & Penzien, McGraw Hill, New York

Reference Textbooks:

1. Dynamics of Structures by Anil K. Chopra, Pearson Education (Singapore), Delhi.
2. Vibrations, Dynamics and Structural systems by Madhujit Mukhopadhyay, CRC press

COMPUTER AIDED STRUCTURAL DESIGN LAB

Department of Civil Engineering					III B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A216M183	L	T	P	C	CIE	SEE	Total
	0	0	3	1.5	40	60	100

Course Outcomes:

1. Analyze and design of structural elements using computer aided tool.
2. Understand the design concept using different software packages.
3. Analyze the 2D building frame using STAAD Pro.
4. Explain the design principle of circular water tank.
5. Design the bridge deck slab using STAAD Pro.

List of Experiments

1. Program for design of slabs Using Excel.
2. Program for design of beams Using Excel.
3. Program for design of column using excel.
4. Program for design of footing using excel.
5. Program for design of staircase using excel.
6. Program for design of cantilever Retaining wall using excel.
7. Analysis of 2D building frame using STAAD Pro.
8. Analysis of truss using STAAD Pro.
9. Analysis of R.C.C. T -beams using STAAD Pro.
10. Analysis of multistoreyed space frame using STAAD Pro.
11. Analysis of circular water tank using STAAD Pro.
12. Analysis of bridge deck slab using STAAD Pro.

RESEARCH METHODOLOGY

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A217M104	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Summarize the basic principles of Research and various methodologies.
2. Understand characteristics of good Hypothesis.
3. Explore importance of Philosophical, Historical and Experimental aspects of research.
4. Identify Research Problem by rigorous literature review.
5. Find the techniques to collect of Primary and secondary data.

Syllabus

UNIT-I

Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research.

UNIT-II

Research Questions and Hypothesis: Variables and their linkages, characteristics of good Hypothesis. Research question and formulation of hypotheses-directional and non-directional hypotheses, Basis for hypotheses

UNIT-III

Research design: Meaning, Need, Features of Good Design, Concepts, Types. Basic principles of Experimental Design, various methods of Research. Survey, Philosophical, Historical, Experimental, Causal Comparative, Genetic, Case Studies

UNIT-IV

Defining the Research Problem: Concept and need, Identification of Research problem, defining and delimiting Research problem, Exercise on research problem definition

UNIT-V

Tools for Data Collection: Collections of Primary Data, Collection of Data through questionnaire and Schedules, other Observation Interview Methods, Collection of Secondary Data, Selection of appropriate method for data collection, Case Study, Focus Group Discussion, Techniques of developing research tools, viz. Questionnaire and rating scales etc, Reliability and validity of Research tools.

Textbooks:

1. Research Methodology, J.W. Best and J.V.Kahn, PHI Limited.7th Edition, 1995
2. Research Methodology: Methods and Techniques, Kothari, C.R., New Age Publisher, 2nd Edition, 2004

Reference Textbooks:

1. Power Analysis for Experimental research A Practical Guide for the Biological, Medical and social Sciences by R. Barker Bausell, Yi-Fang Li Cambridge University Press.
2. Design of Experience: Statistical Principles of Research Design and Analysis, by Robert O. Kuehl Brooks/cole.

COST MANAGEMENT OF ENGINEERING PROJECTS

Department of Civil Engineering					IV B.Tech I Semester		
Course Code	Hours/Week			Credits	Marks		
A217M105	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. understand various Strategic Cost Management Process
2. Determine various stages of project execution.
3. Estimate the rate analysis and project cost control of the various items.
4. Understand the process of Break-even and profit Analysis.
5. Evaluate the Quantitative techniques for cost management.

Syllabus

UNIT-I

Introduction: Overview of the Strategic Cost Management Process Cost concepts in decision-making, Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System, Inventory valuation, Creation of a Database for operational control, Provision of data for Decision-Making.

UNIT-II

Project**:** meaning, Different types, why to manage, cost overruns centers, various stages of project execution**:** conception to commissioning. Project execution as conglomeration of technical and nontechnical activities.

UNIT-III

Detailed Engineering activities: Pre project execution main clearances and documents Project team**:** Role of each member. Importance Project site**:** Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning**:** mechanical and process

UNIT-IV

Cost Behavior and Profit Planning: Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis. Pricing strategies**:** Pareto Analysis.

UNIT-V

Total Quality Management and Theory of constraints: Activity-Based Cost Management, Bench Marking, Balanced Score Card and Value-Chain Analysis. Budgetary Control, Flexible Budgets; Performance budgets. Quantitative techniques for cost management, Linear Programming, PERT/CPM,

Textbooks:

1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2. Charles T. Horngren and George Foster, Advanced Management Accounting

TECHNICAL PAPER WRITING

Department of Civil Engineering					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A2181TPW	L	T	P	C	CIE	SEE	Total
	2	0	0	2	40	60	100

Course Outcomes:

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title Ensure the good quality of paper at very first time submission.
4. Analyze the results and explain in detail.
5. understand the importance of Conclusion and future scope.

Syllabus

UNIT-I

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness.

UNIT-II

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

UNIT-III

Requirements for writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature.

UNIT-IV

Requirements for writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion.

UNIT-V

Skills required for writing the Conclusions, useful phrases, how to ensure paper is as good as it could possibly be the first-time submission.

Textbooks:

1. The Handbook of Technical Writing, C. T. Brusaw, G. J. Alred, and W. E. Oliu, St. Martin's Press, 10th Edition, 2011.
2. Technical Writing: A Practical Guide for Engineers and Scientists, P. A. Laplante, CRC Press, 2011.

EARTHQUAKE RESISTANT DESIGN OF BUILDINGS

Department of Civil Engineering					IV B.Tech II Semester		
Course Code	Hours/Week			Credits	Marks		
A218M106	L	T	P	C	CIE	SEE	Total
	3	0	0	3	40	60	100

Course Outcomes:

1. Quantify mechanical behaviour of earth's surface, seismic hazards and its effects.
2. Identify the Conceptual design methods for solving engineering problems
3. Understand the internal parameters of the structures for seismic design source.
4. Assess the design component or process to meet desired needs within realistic constraints.
5. Analyse and design buildings to resist seismic forces.

Syllabus

UNIT-I

Engineering Seismology**:** Earthquake phenomenon cause of earthquakes – Faults – Plate tectonics – Seismic waves – Terms associated with earthquakes – Magnitude/Intensity of an earthquake – scales – Energy released – Earthquake measuring instruments – Seismoscope, Seismograph, accelerograph – Characteristics of strong ground motions – Seismic zones of India.

UNIT-II

Conceptual design**:** Introduction – Functional planning – Continuous load path – Overall form – simplicity and symmetry – elongated shapes – stiffness and strength – Horizontal and Vertical members – Twisting of buildings – Ductility – definition – ductility relationships – flexible buildings – framing systems – choice of construction materials – unconfined concrete – confined concrete – masonry – reinforcing steel.

UNIT-III

Introduction to earthquake resistant design: Seismic design requirements – regular and irregular configurations – basic assumptions – design earthquake loads – basic load combinations – permissible stresses – seismic methods of analysis – factors in seismic analysis – equivalent lateral force method – dynamic analysis – response spectrum method – Time history method.

UNIT-IV

Reinforced Concrete Buildings: Principles of earthquake resistant deign of RC members Structural models for frame buildings – Seismic methods of analysis – Seismic deign methods – IS code based methods for seismic design – Seismic evaluation and retrofitting – Vertical irregularities – Plan configuration problems – Lateral load resisting systems – Determination of design lateral forces – Equivalent lateral force procedure – Lateral distribution of base shear.

UNIT-V

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls - sectional shapes – variations in elevation – cantilever walls without openings – Failure mechanism of non – structures – Effects of non-structural elements on structural system – Analysis of non-structural elements – Prevention of non-structural damage – Isolation of non-structures

Textbooks:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press, 2012.
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd, 2008.

Reference Textbooks:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons, 2015.
2. Masory and Timber structures including earthquake Resistant Design – Anand S.Arya, Nemchand & Bros,2009.

Reference codes

1. IS: 1893 (Part-1) -2016. "Criteria for Earthquake Resistant – Design of structures." B.I.S., New Delhi.
2. IS: 4326-1993, "Earthquake Resistant Design and Construction of Building", Code of Practice B.I.S., New Delhi.
3. IS: 13920- 2016, "Ductile detailing of concrete structures subjected to seismic force" – Guidelines, B.I.S., New Delhi.

MOOCS COURSES

It is instructed that a student has to opt minimum 12 week online courses to meet the required credit.

1. Introduction to Accounting and Finance for Civil Engineers
2. Development and Applications of Special Concretes
3. Geosynthetics And Reinforced Soil Structures
4. Maintenance and Repair of Concrete Structures
5. Advanced Topics in the Science and Technology of Concrete
6. Advanced Soil Mechanics
7. Soil Structure Interaction
8. Modern Construction Materials
9. Expansive Soil
10. Scheduling Techniques in Projects
11. Introduction to Lean Construction (Module 1 - Lean Basics)
12. Construction Methods and Equipment Management
13. Safety in construction
14. Plastic Analysis
15. Sub Structure Design