# ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

COLLEGE CODE : C4

# CIVIL ENGINEERING

***For***

**B.TECH. FOUR YEAR DEGREE COURSE**

***(Applicable for the batches admitted from 2018-2019)***


## JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

**(UGC-AUTONOMOUS)**

**Narsampet, Warangal (Rural) – 506 332**
**Telangana State, India**

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**
**NARSAMPET, WARANGAL(Rural) – 506 332. T.S.**

# Academic Regulation-2018 of B.Tech (Regular) Programme under Choice Based Credit System (CBCS)

*(Effective for the students admitted into I-Year from the Academic year 2018-2019)*

**1. Award of B.Tech. Degree**

A student will be declared eligible for the award of the B.Tech. Degree if he / she fulfills the following academic regulations :

i) Pursued a course of study for not less than four academic years and not more than eight academic years.

ii) Register for 160 credits and should secure 160 credits. A student will be eligible to get B.Tech. Degree with Honors, if he/she completes an additional 20 credits through **Massive Online Open Courses (MOOCs).** Each subject offered by UGC/AICTE/NPTEL/NEC or equivalent carries 2 credits.

iii) A Student can earn 2 credits by active participation in NSS. As no grade is defined for these 2 credits they are not included in CGPA Calculations. Based on their participation in NSS activities, the student can earn maximum of 100 activity points as specified in the **Annexure.**

Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course unless extension is granted by College Academic Council (CAC) to complete the course for a further period.

**2. Courses of Study**

The following courses of study are offered at B.Tech level :

| Branch Code | Branch |
|---|---|
| 01 | Civil Engineering |
| 02 | Electrical & Electronics Engineering |
| 03 | Mechanical Engineering |
| 04 | Electronics & Communication Engineering |
| 05 | Computer Science &Engineering |

**3. Credits :**

All subjects/ courses are to be registered by a student in a semester to earn credits. Credits shall be assigned to each subject/course in a L:T:P:C (Lecture Periods: Tutorial Periods: Practical Periods: Credits) structure, based on the following table.

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

**4. Subject / Course Classification :**

| S.No. | | Credits |
|---|---|---|
| 1 | Humanities and Social Sciences including Management courses | 12* |
| 2 | Basic Science courses | 25* |
| 3 | Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. | 24* |
| 4 | Professional core courses | 48* |
| 5 | Professional Elective courses relevant to chosen specialization / branch | 18* |
| 6 | Open subjects-Electives from other technical and / or emerging subjects | 15* |
| 7 | Project work, seminar and internship in industry or elsewhere | 15* |
| 8 | Mandatory courses [Environmental Sciences, Induction Program, Indian Constitutional, Essence of Indian Traditional Knowledge] | Non-Credit |
| | **Total (%)** | **160 (100%)** |

**Minor variation is allowed as per need of the respectivedisciplines*

5. **Course Registration:**

5.1 Each student, on admission shall be assigned to a Faculty Advisor/ Counselor who shall advise her/him about the academic programmes and counsel on the choice of courses in consideration with the academic background and student's career objectives.

5.2 Faculty advisor shall be only from the engineering departments. With the advice and consent of the Faculty Advisor the student shall register for a set of courses he/she plans to take up for each Semester.

5.3 The student should meet the criteria for prerequisites to become eligible to register for that course.

5.4 A student is allowed to register for more than 160 credits in completion of B.Tech. programme. However, additionalcredits scored shall not be considered for award of division and also not considered for calculation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA). For such extra subject(s) registered a letter grade alone will be indicated in te Grade card as a performance measure.

**6. Subjects / Courses to be offered:**

6.1 Students shall have to register for the courses during the preparation and practical examinations of the previous semester. However for the first year, the students have to register for courses within a week from the commencement of class work.

6.2 The maximum number of students to be registered in each course shall depend upon the physical facilities available.

6.3 The information on list of all the elective courses offered in every department specifying the credits, the prerequisites, a brief description of syllabus or list of topics and the time slot shall be made available to the student in time.

6.4 In any department, preference for registration shall be given to those students of that department for whom the course is a core course.

6.5 The registration for the inter departmental and/or open elective courses shall be on first come first served basis, provided the student fulfills prerequisites for that course, if any. The number of students to be registered shall be based on the class room and laboratory capacity. Every effort shall be made by the Department/Centre to accommodate as many students as possible.

6.6 No course shall be offered unless there is a minimum of 20 students or one half of the class strength specified.

**7. Programme Pattern:**

i. The entire course of study is of four academic years. All years shall be on semester pattern i.e two semesters per year. For each semester there shall be a minimum of 90 instruction days.

ii. A student is eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination.

iii. There shall be no branch transfers after the completion of admission process.

**8. Distribution and Weightage of Marks:**

8.1 The Performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks for theory and 100 marks for practical subjects. In addition, Industry oriented mini-project, Seminar, Comprehensive Viva-Voce and Major Project Work shall be evaluated for 100 marks.

8.2 For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination.

8.3 For theory subjects, during the semester there shall be 2 mid-term examinations (internal exams) and two assignments carrying 5 marks each.

8.4 Each mid-term examination of 90 minutes consists of Part-A (objective type) for 10 marks and Part-B (subjective paper) for 15 marks. Mid-term examination paper shall contain 5 questions out of which the student has to answer 3 questions of each 5 marks. First mid-term examination shall be conducted for first 2.5 units (50%) of syllabus and second mid-term examination shall be conducted for remaining 2.5 units (50%) of syllabus. Objective type may be with multiple choice questions, true/false, match type questions, fill in the blanks etc.

For the subject Gender Sensitization 30 marks are allotted for assignments and 70 marks are allotted for mid examination. Mid examination consists of questions and student has to answer 5 questions of 14 marks of each.

8.5 First set of Assignment should be submitted before the conduct of the first mid-term examination and the second set of Assignment should be submitted before the conduct of the second mid-term examination. The assignments shall be as specified by the concerned subject teacher.

8.6 The first mid-term examination marks and first assignment marks make first set of internal evaluation and second mid-term examination marks and second assignment marks make second set of internal evaluation marks. After adding 70% of the marks obtained in the first or second set whichever is higher and 30% of marks obtained in the first or second set whichever is lower are to be considered for awarding internal marks.

8.7 The details of the Question Paper pattern for theory examination is as follows:

(i) The end semesters exam will be conducted for 70 Marks which consist of two parts viz. Part-A for 20 Marks and Part-B for 50 Marks.

(ii) Part-A is compulsory question which consist of 5 Sub-questions, one from each unit, carrying 4 Marks each.

(iii) Part-B consist of 5 questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions, there will be an either or choice(i.e There will be two questions from each unit and student will answer any one question).

8.8 For practical subjects there shall be a continuous internal evaluation during the semester for 30 sessional marks and 70 end examination marks. Out of the 30 sessional marks, day-to-day work in the laboratory shall be evaluated for 20 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with one external examiner and one internal examiner. The external examiner shall be appointed from the panel of examiners as recommended by the Board of Studies in respective Branches.

8.9 For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 30 marks for internal evaluation (20 marks for day-to-day work and 10 marks for internal test) and 70 marks for end examination.

8.10 There shall be a mini project preferably suggested by the industry of their specialization. The mini project shall be submitted in a report form and should be presented before the committee, which shall be evaluated for 100 marks. The committee consists of Head of the Department, Supervisor of mini project and a senior faculty member of the department.

8.11 There shall be a seminar presentation by the student. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the departmental committee consisting of Head of the Department, seminar supervisor and a senior faculty member. The seminar report and presentation shall be evaluated for 100 marks.

8.12 There shall be an internship suggested by the industry of their specializatiion. After completing their internship stdentshould submit a report in the department, which shall be evaluated by the department for 100 marks.

8.13 The Comprehensive Viva-Voce and Evaluation : The Comprehensive Viva-Vocewill be conducted by a Committeecosisting of (i) Head of the Department. (ii) Two Senior Faculty Members of the Department. The Comprehensive Viva-Voce is imed to assess the student's understanding in various subjects he/she studied during the B.Tech. Programme. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee.

8.14 Out of a total of 100 marks for the major project work, 30 marks shall be for internal evaluation and 70 marks for the end semester examination. The end semester examination (Viva-Voce) shall be conducted by a committee. The committee consists of an External Examiner, Head of the

Department and the Project Supervisor. The internal evaluation shall be on the basis of two seminars given by each student on the topic of his major project.

8.15 There shall be an optional third midterm examination and intereste students can register for third mid examination by paying prescribed registration fee, which covers entire semester syllabus carrying 25 marks and assignment 5 marks.

For evaluation of internal marks the marks obtained in best two midterm examinations will be considered.

**9. Attendance Requirements:**

9.1 A student shall be eligible to appear for the end examinations if he acquires a minimum of 75% of aggregate attendance in all the subjects.

9.2 Condonation of shortage of attendance in each subject up to 10% on genuine grounds in each semester may be granted by the College Academic Council on recommendation by the Principal.

9.3. Shortage of attendance below 65% shall in no case be condoned.

9.4. Student falling short of attendance as specified above will be detained.

9.5. A student will not be promoted to the next semester unless he/she satisfies the attendance requirement of the present semester. They may seek-re-admission for that semester when offered next. They may seek re-registration for all those subjects registered in that semester, in which he got detained, by seeking re-admission for that semester as and when offered; in case there are any professional electives and/or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the same set of elective subjects offered under that category. A stipulated fee decided by the College Academic Council shall be payable towards condonation of shortage of attendance.

**10. Minimum Academic Requirements:**

The following academic requirements have to be fulfilled in addition to the attendance requirements mentioned in item No. 09.

10.1 A student shall be deemed to have fulfilled the minimum academic requirements and earned the credits allotted to each theory or practical or design or drawing subject or project if he/she secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.

**10.2 Promotion Rules :**

| S.No. | Promotions | Conditions to be fulfilled |
|---|---|---|
| 1. | First Year first semetser to first year second semester | Regular Course of study of first year first semetster |
| | First year second semeter to second year first semester | (i) Regular course of Study of first year semester<br>(ii) Must have secured atleast 20 credits out of 40 credits i.e. 50% credits upto first year second semester from all relevant regular and supplementary examinations, whichever the student takes those examinations or not |
| 2. ` | Second year first semester to second year second semester | Regular course of study of second year first semester |
| | Second year second semester to third year first semester | (i) Regular course of study of second year second semester<br>(ii) Must have secured atleast 48 credits out of 80 credits i.e. 60% credits upto second year second semester from all relevant regular and supplemenatary examinations, whether the student takes those examina tions or not |
| 3. | Third year first semester to third year second semester | Regular course of study of third year first semester. |
| | Third year second semester to fourth year first semester | (i) Regular course of study of third year second semester<br>(ii) Must have secured atleast 72 credits out of 120 credits i.e. 60% credits upto third year sec--ond semester from all relevant regular and supplemenatary examinations, whether the stu dent takes those examinations or not |
| | Fourth year first semester to fourth year second semester | Regular course of study of fourth year first semester. |

10.5 A student shall register for all subjects covering 160 credits as specified and listed (with the relevant course/subjects classifications as mentioned) in the course structure, put up all the attendance and academic requirements and securing a minimum of C Grade (Pass Grade) or above in each subject, and earn 160 credits securing Semester Grade Point Average (SGPA) $\geq$ 5 in each semester, and Cumulative Grade Point

Average (CGPA) $\geq$ 5 at the end of each successive semester to successfully complete the B.Tech Programme.

10.6 When a student is detained due to shortage of attendance in any semester, he/she may be re-admitted into that semester, as and when offered, with the Academic Regulations of the batch into which he gets readmitted. However, no grade allotments of SGPA/CGPA calculations will be done for that entire semester in which he got detained.

10.7 When a student is detained due to lack of credits in any year, he/she may be readmitted in the next year, after fulfillment of the academic requirements, with the academic regulations of the batch into which he gets readmitted.

10.8 A student is eligible to appear in the end semester examination in any subject/course, but absent at it or failed (thereby failing to secure C Grade or above), may reappear for that subject/course at the supplementary examinations as and when conducted. In such cases, his/her internal marks assessed earlier for that subject/course will be carried over, and added to the marks to be obtained in the supplementary examination, for evaluating his performance in that subject.

**11. Grading Procedure**

11.1 Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practicals or Seminar or Project or Mini-Project, Internship based on the % of marks obtained in End examination, both taken together as specified in item No. 07 above and a corresponding Letter Grade shall be given.

11.2 As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed.

**Grades and Grade Points**

| **% of Marks Secured in a Subject / Course** (Class Intervals) | **Letter Grade** (UGC Guidelines) | **Grade Points** |
|---|---|---|
| Greater than or equal to 90% | O (Outstanding) | 10 |
| 80 and less than 90% | $A^+$ (Excellent) | 9 |
| 70 and less than 80% | A (Very Good) | 8 |
| 60 and less than 70% | $B^+$ (Good) | 7 |
| 50 and less than 60% | B (Average) | 6 |
| 40 and less than 50% | C (Pass) | 5 |
| Below 40% | F (Fail) | 0 |
| Absent | Ab | 0 |

11.3 A student obtaining 'F' Grade in any subject shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' in the End Semester Examination, as and when offered. In such cases, his Internal Marks in those Subject(s) will remain same as those he obtained earlier.

11.4 A Letter Grade does not imply any specific % of Marks.

11.5 In general, a student shall not be permitted to repeat any Subject/ Course(s) only for the sake of 'Grade Improvement' or 'SGPA/CGPA Improvement'. However, he/she has to repeat all the Subjects/Courses pertaining to the Semester, when he/she is detained (as listed in Item No. 10.7 - 10.8).

11.6 A student earns Grade Point (G.P.) in each Subject/Course, on the basis of the Letter Grade obtained by him in that Subject/Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points'(C.P.) are computed by multiplying the Grade Point with Credit Points (C.P.) for that particular Subject/Course.

**Credit points (C.P.) = Grade Points (G.P.) X Credits …….. For a Course**

11.7 The student passes the Subject / Course only when he gets G.P. > (C Grade above).

11.8 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points ( C.P.) Secured from All Subjects/Courses registered in a semester, by the total number of credits registered during that semester. SGPA is rounded off to Two Decimal Places. SGPA is thus computed as

$\left\{\sum_{i=1}^{N} C_i G_i\right\} / \left\{\sum_{i=1}^{N} C_i\right\}$ ... For each semester

Where "*i*" is the subject indicator index (taken into account all subjects in a semester), ' N ' is the number of subjects 'REGISTERED' for the Semester (as specifically required and listed under the course Structure of the parent Department), and $C_i$ is the number of Credits allotted to the $i^{th}$ subject and $G_i$ is represents the Grade Points (G.P.) corresponding to the Letter Grade awarded for that $i^{th}$ Subject.

11.9 The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in all registered Courses (with an exemption of 6 credits in electives subjects) in all semesters. CGPA is rounded off to two decimal places. CGPA, is thus computed from the I year, Second-Semester onwards, at the end of each semester, as per the formula.

$\left\{\sum_{j=1}^{M} C_j G_j\right\} / \left\{\sum_{j=1}^{M} C_j\right\}$ ...for all 'S' semesters registered (i.e., upto and inclusive of 'S' semester, S ≥ 2)

Where ' M ' is the total No. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the student has 'REGISTERED' from the 1st Semester onwards upto and inclusive of the semester S (obviously M > N ), '*j*' is the subject indicator index takes into account all subjects from 1 Subject and $G_j$ represents the Grade Points (GP) corresponding to the Letter Grade awarded for that $j^{th}$ subject. After registration and completion of I year I semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

11.10 For Merit Ranking or Comparison purpose or any other listing only the rounded off values CGPAs will be used.

11.11 For calculation listed in item No.11.6 - 11.10**,** performance in failed subjects/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.

**12. Passing Standards :**

12.1 A student shall be declared successful or 'passed' in a Semester only when he gets a SGPA > 5 (at the end of that particular Semester); and a student shall be declared successful or 'passed' in the B.Tech. Programme, only when he gets a CGPA > 5;subject to the condition that he secures a GP > 5 (C Grade or above) in every registered Subject/ Course in each Semester (during the B.Tech Programme) for the Degree Award as required.

12.2. In spite of securing C Grade or above in some (or all) Subjects/Courses in any Semester, if a Student receives a SGPA < 5 and /or CGPA < 5 at the end of such a Semester, then he may be allowed on the following specific recommendations of the Head of the Department and subsequent approval from the Principal.

i.) To go into the next subsequent Semester (Subject to fulfilling all other attendance and academic requirements as listed under items No.9- 10).

ii.) To 'improve his SGPA of such a Semester (and hence CGPA to 5 or above', by reappearing for one or more as per student's choice or the same subject (s)/courses(s) in which he has secured C Grade (s) in that semester,at the supplementary examinations to be held in the next subsequent semester(s). In such cases, his/her internal marks in those subject(s) will remain same as those he obtained earlier. The newly secured letter grades will be recorded and taken into account for calculation of SGPA and CGPA, only if there is an improvement.

12.3. A Student shall be declared successful or 'passed' in any Mandatory (non-credit)Subject /Course, by appearing and pass in the examination conducted by the institute like credit courses and fulfill minimum attendance requirement.

12.4. After the Completion of each semester, a Grade Card or Grade Sheet (or Transcript) shall be issued to all the Registered Students of that Semester, indicating the Letter Grades and Credits earned. It will show the details of the Courses Registered (Course Code, Title, Number of Credits, Grade earned etc.), credits earned, SGPA and CGPA.

**13. Declaration of Results :**

13.1 Computation of SGPA and CGPA are done using the procedure listed in Item no.11.6 – 11.10.

13.2 For Final % of Marks equivalent to the computed final CGPA, the following formula may be used:

% **of Marks = (Final CGPA – 0.5) X 10**

**14. Revaluation and Re-Counting :**

14.1 A student can apply for re-counting for the appeared theory subjects within the specified tiemperiod given by controller of examinations.

14.2 A student can apply for revaluation through prescribed application to the controller of examinations within specified time period; however the student can apply revaluation of the answer scripts not exceeding two theory subjects in a semester.

**15. Award of Degree under CBCS :**

15.1 A student will be declared eligible for the award of the B.Tech. Degree if he/she fulfills the following academic regulations:

i) Pursued a course of study for not less than four academic years and not more than eight academic years.

ii) Register for 160 credits and secure 160 credits. A student will be eligible to get B.Tech. Degree with Honours, if he/she completes an additional 20 credits through Massive Online Open Courses (MOOCs).

iii) Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course unless extension is granted for a further period by College Academic Council (CAC) to complete the course.

15.2 A student who qualifies for the Award of the Degree as per **item 13.2** shall be placed in the following classes.

**Award of Division**

| S.No. | Division | CGPA |
|---|---|---|
| 1. | First class with Distinction | $\geq$ 7.5 |
| 2. | First Class | $\geq$ 6.5 but less than 7.5 |
| 3. | Second Class | $\geq$ 5.5 but less than 6.5 |
| 4. | Pass Class | $\geq$ 5 but less than 5.5 |

15.3 A student with final CGPA (at the end of the Course) < 5 will not be eligible for the Award of the Degree.

**16. Withholding of Results :**

If the student has not paid fees to University/College at any stage or has pending dues against his/her name due to any reason whatsoever, or if any case of indiscipline is pending against him/her, the result of the student may be withheld, and he/she will not be allowed to go into the next higher semester. The Award or issue of the Degree may also be with held in such cases.

**17. Transitory Regulations :**

Student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmission to the same subject/course (or equivalent subjects/courses, as the case may be), and same Professional Electives/Open Electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of his I year I Semester).

**Details of Transitory regulations :**

**Admission with advance standing :** These may arise in the following cases :

1. When a student seeks transfer from other college to Jayamukhi Institute of Technological Sciences (JITS) and desires to pursue study at JITS in an eligible branch of study.
2. When students of JITS get transferred from on eregulation to another regulation or from previous syllabus to revised syllabus.
3. When as student after long discontinuity rejoins the college to complete his Programme of study for the award of a degree.

**I. Transitory Regulations :** For students admitted under advance standing, these transitory regulations will provide the modus iperandi. At the time of such admission, basd on the Programme pursued (case by case).

1. Equivalent courses completed by the student are established by the Chairman, BOS concerned.
2. Marks/Credits are tranferred for all such equivalent courses and treated as successfully cleared in the Programme study prescribed by JITS.
3. A Programme chart of residual courses not cleared will be derived and a Programme of study with duration specified will be prescribed for pursuing at JITS.
4. Marks obtained in the previous systtem if the case be, are converted to grades and accordingly CGPA is calculated. All other modalities and

regulations governing shall be the same as those applicable to the stream of students with whom such a candidate is merged.

5. The students those who are on rolls to be provided one chance to write the internal exams in the **subjects not studied,** as per the clearance letter (equivlence) issued by Chairman, BOS.
6. After the revision of the regulations, the students of the previous batches will be given two subsequent chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits within stipulated period.
7. When the student seeks admission into the course,his/her eligibility to the year of admission is based on his eligibility criteria of the previous institution where he studied earlier, subject to the ratification of TSCHE and JNTUH. Once he/she admitted after scrtiny the rules of JITS applicable from the date of admission.
8. When the student seeks admission from JNTUH regulations to autonomous regulations, the eligibility criteria to the year of admission is based on the eligibility criteria of JNTUH regulations for the batch in which he/she admitted. After taking admission the autonomous regulations are applicable for the subsequent promotion to the next academic year.

**II. Transitory Regulations for the students who have discontinued the programme :**

1. Student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for readmision to the same subject/course (or equivalent subjects/ courses, as the case may be).
2. The student is permitted to register for ProfessionalElectives/Open Electives (or from set/category of electives or equivalents suggested, as the case may be) as and when they are offered (within the time-frame of 8 years from the date of commencement of his I year I Semester).

**Scope :**

1. The academic regulations should be read as a whole, for the purpose of any interpretation.
2. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
3. JITS may change or amend te academic regulations, corse structure or syllabi at any time, and the changes or amendments made shall be applicable to all students with effect from the dater of notified.

**18. General :**

i. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.

ii. Where the words “subject” or “subjects”, occur in these regulations, they also imply “course” or “courses”.

iii. The academic regulations should be read as a whole for the purpose of any interpretation.

iv. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, College Academic Council is final.

***Note: The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College Authorities.***

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

***(Effective for the students getting admitted into II-Year from the academic year 2019-2020 and on wards)***

1. The students admitted to B.Tech. Programme under Lateral Entry Sceme will pursue the course for not less than three academic years and not more than six academic years.

2. The students have to acquire all credits (Total 120) from II to IV year of B.Tech. Program (Regular) for the award of the degree. Register all credits and secure all credits with the exemption of 6 credits.

3. A student will be eligible to get B.Tech. Degree with Honours, if he/she completes an additional 20 credits through Massive Online Open Courses (MOOCs).

4. A student can earn 2 credits by active participation in NSS. As no grade is defined for these 2 credits they are not included in CGPA calculations. Based on their participation in NSS acibities, the student can earn maximum of 100 actibity points.

5. Student, who fails to fulfill the requirements for the award of the degree in six consecutive academic years from the year of admission, shall forfeit his seat unless extension is granted by the College Academic Council to complete the Programme for a further period.

6. The same attendance regulations are to be adopted as that of B.Tech. (Regular).

**7. Promotion Rules :**

| S.No. | Promotions | Conditions to be fulfilled |
|---|---|---|
| 1. | Second year first semester to second year second semester | Regular course of study of second year first semester |
| | Second year second semester to third year first semester | (i) Regular course of study of second year second semester<br>(ii) Must have secured atleast 24 credits out of 40 credits i.e., 60% credits upto second year second semester from all relevant regular and supplementary examinations, whether the student takes those examinations or not |
| 2. | Third year first semester to third year second semester | Regular course of study of third year first semester |
| | Third year second semester to fourth year first semester | (i) Regular course of study of third year second semester<br>(ii) Must have secured atleast 48 credits out of 80 credits i.e., 60% credits upto third year second semester from all relevant regular and supplementary examinations, whether the student takes those examinations or not |
| | Fourth year first semester to fourth year second semester | Regular course of study of fourth year first semester |

**8. All other regulations as applicable for B.Tech. IV year degree course (Regular) will hold good for B.Tech. (Lateral Entry Scheme)**

***Note : The College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College Authorities.***

## MALPRACTICES RULES

### DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

| | Nature of Malpractices/Improper Conduct | Punishment |
|---|---|---|
| 1. (a) | Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with of related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination) | Expulsion from the examination hall and cancellation of the performance in that subject only. |
| (b) | Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter. | Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidtes involved. In case of an outsider, he will be handed over to the police and a case is registered against him. |
| 2. | Has copied in the examination hall from any paper, book, programmale calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinationsand project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester.<br>The Hall Ticket of the candidate is to be canelled. |

| | | |
|---|---|---|
| 3. | Impersonates any other candidate in connection with the examination. | The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project rork) already appeared and shall not be allowed to appear for exminations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. the continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him. |
| 4. | Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination. | Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinationsand project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. |

| | | |
|---|---|---|
| 5. | Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks. | Cancellation of the performance in that subject. |
| 6. | Refuses to obey the orders of the Chief Superintendent/Assistant-Superintendent/any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walkout or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible represenation, assaults the officer-incharge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief whichresult in damage to or destrction of property in the examinagion hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination. | In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them. |
| 7. | Leaves the exam hall taking away answer script or intentially tears of the script or any part thereof inside or outside the examination hall. | Expulsion from the examination hall and cancellation of performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. |

| | | |
|---|---|---|
| 8. | Possess any lethal weapon or fire-arm in the Examination hall. | Expulsion from the examination hall and cancellation of performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred and forfeits the seat. |
| 9. | If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8. | Student of the colleges expulsion from the examination hall and cancellation of performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred and forfeits the seat.<br>Peson(s) who do not belong to the College will be handed over to police and, a police case will be registered against them. |
| 10. | Comes in a drunken condition to the examination hall. | Expulsion from the examination hall and cancellation of performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester. |
| 11. | Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny. | Cancellation of performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work of that Semester/ year examination. |
| 12. | If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be referred to Examination Result Processing Committee (ERPC) further action to award suitable punishment. | |

# ANNEXURE

## NSS ACTIVITY EVALUATION PROCEDURE

The college shall consolidate the activity points earned by the students from his/her first year on an academic year basis and enter the consolidated marks at the end of the student's course completion. For lateral entry students the marks will be consolidated from third semester to the end of the student course completion. The consolidated marks will be evaluated for max of 100 marks as per the evaluation sheet for lateral entry students. The college online portal shall be open for a specific time period with prior intimation to enter the activity marks. All documental proof for awarding the activity marks shall be submitted and verified by NSS authorities of the college before awarding the points to the student. Each activity points earned will be evaluated as one mark during final consolidaton of marks.

**THE MAIN ACTIVITY SEGMENTS ARE LISTED BELOW**

1. National Initiatives
2. Sports and Games
3. Cultural Activities
4. Leadership and management

The following table gives list of activities under each of these segments, the level of achievement, activity points, evidence needed to assign the points and the minimum duration needed for certain activities.

Additional Activities will be updated on regular basis as per the NSS hand book issued by the state government NSS unit.

| Activity Head | Sl. No. | Activity | Achievement levels and Assigned Activity points | | | | | ** Approval Documents | Maximum points |
|---|---|---|---|---|---|---|---|---|---|
| | | * Level | I | II | III | IV | V | | |
| National Initiatives Participation | 1. | Cleanliness Drive | 5 | 10 | 15 | 20 | 25 | a & b | 25 |
| | 2. | Children Aware--ness Programme | 5 | 10 | 15 | 20 | 25 | a & b | 25 |
| | 3. | Health Awareness Programme | 5 | 10 | 15 | 20 | 25 | a & b | 25 |
| | 4. | Environment Prot--ection Programme | 5 | 10 | 15 | 20 | 25 | a & b | 25 |

| Activity Head | Sl. No. | Activity | Achievement levels and Assigned Activity points | | | | | ** Approval Documents | Maximum points |
|---|---|---|---|---|---|---|---|---|---|
| Sports and Games | | * Level | I | II | III | IV | V | | |
| | 1. | Organised by NCC or Government Body For participation | 5 | 10 | 15 | 20 | 25 | a & b | 25 |
| | | First Prize | 10 | 15 | 20 | 25 | 30 | a,b & c | 30 |
| | | Second Prize | 8 | 13 | 18 | 23 | 28 | a,b & c | 28 |
| | | Third Prize | 6 | 11 | 16 | 21 | 26 | a,b & c | 26 |
| Cultural Activities | 1. | Music | 5 | 10 | 15 | 20 | 25 | a | 25 |
| | 2. | Performing Arts | 5 | 10 | 15 | 20 | 25 | a | 25 |
| | 3. | Leterary Arts | 5 | 10 | 15 | 20 | 25 | a | 25 |
| Leadership and Management | 1. | Free Medical Camp | 5 | 10 | 15 | 20 | 25 | a,b,c & d | 25 |
| | 2. | Rural Assistance Camp | 5 | 10 | 15 | 20 | 25 | a,b,c & d | 25 |
| | 3. | Education & Career Counselling Camp | 5 | 10 | 15 | 20 | 25 | a,b,c & d | 25 |
| | 4. | NSS special Camp | 5 | 10 | 15 | 20 | 25 | a,b,c & d | 25 |
| | 5. | Drives organised by Govt. bodies for Social Awareness | 5 | 10 | 15 | 20 | 25 | a,b,c & d | 25 |
| | 6. | Social Survey Camp by NSS | | | | | | | |

* Level I - College Events

* Level II - Zonal Events

* Level III - State / University Events

* Level IV - National Events

* Level V - International Events

** Approval Documents : (a) Certificate, (b) Letter from Authorities, (c) Appreciation recognition Letter, (d) Documentary evidence.

## MOOCS EVALUATION PROCEDURE

A student will be eligible to get under graduatedegree with honours if he/she complete an additional 20 credits acquired through MOOCS as directed by AICTE and UGC. The additional 20 credits can be earned by the student by successfully registering and completing the courses offered by the following government agency.

1. SWAYAM
2. UGC
3. NPTEL
4. IGNOU
5. NIOS
5. CEC

On successful completion of the course, the student have to submit his/her certificates issued by the above government agency to review committee framed by Principal and HODs. The approval of the review committee for each course will earn 2 credits to his/her curriculum. Additionalcourses will be updated on regular basis as per the AICTE and UGC guidelines.

* * * * * * * *

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## COURSE STRUCTURE
(Applicable for the batches admitted from A.Y. 2018-2019 onwards)

### I YEAR - I SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | J1001 | Mathematics-I | 30 | 70 | 3 | 1 | 0 | 4 |
| 2 | J1007 | Engineering Physics | 30 | 70 | 3 | 1 | 0 | 4 |
| 3 | J1008 | Engineering Chemistry | 30 | 70 | 3 | 1 | 0 | 4 |
| 4 | J1301 | Engineering Mechanics | 30 | 70 | 3 | 1 | 0 | 4 |
| 5 | J1009 | Engineering Physics & Chemistry Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 6 | J1303 | Engineering Workshop | 30 | 70 | 1 | 0 | 3 | 2.5 |
| | | Induction Programme | | | | | | |
| | | **Total Credits** | | | **13** | **4** | **6** | **20** |

### I YEAR - II SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | J2002 | Mathematics-II | 30 | 70 | 3 | 1 | 0 | 4 |
| 2 | J2011 | English | 30 | 70 | 2 | 0 | 0 | 2 |
| 3 | J2202 | Basic Electrical & Electronics Engineering | 30 | 70 | 2 | 1 | 0 | 3 |
| 4 | J2302 | Engineering Graphics | 30 | 70 | 1 | 0 | 4 | 3 |
| 5 | J2501 | Programming for Problem Solving | 30 | 70 | 3 | 1 | 0 | 4 |
| 6 | J2203 | Basic Electrical & Electronics Engineering Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 7 | J2502 | Programming for Problem Solving Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 8 | J2012 | English Language & communication Skills Lab | 30 | 70 | 0 | 0 | 2 | 1 |
| | | **Total Credits** | | | **11** | **3** | **12** | **20** |

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## COURSE STRUCTURE
(Applicable for the batches admitted from A.Y. 2018-2019 onwards)

### II YEAR - I SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | J3101 | Introduction to Civil Engineering | 30 | 70 | 3 | 0 | 0 | 3 |
| 2 | J3102 | Civil Engineering-Societal & Global Impact | 30 | 70 | 3 | 0 | 0 | 3 |
| 3 | J3103 | Solid Mechanics-I | 30 | 70 | 3 | 1 | 0 | 4 |
| 4 | J3104 | Fluid Mechanics | 30 | 70 | 3 | 0 | 0 | 3 |
| 5 | J3105 | Surveying & Geomatics | 30 | 70 | 3 | 1 | 0 | 4 |
| 6 | J3106 | Solid Mechanics Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 7 | J3107 | Surveying Lab - I | 30 | 70 | 0 | 0 | 3 | 1.5 |
| | | **Total Credits** | | | **15** | **2** | **6** | **20** |
| 8 | JMC01 | Environmental Sciences | 100 | 0 | 2 | 0 | 0 | 0 |

### II YEAR - II SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | J4108 | Engineering Hydrology | 30 | 70 | 3 | 0 | 0 | 3 |
| 2 | J4005 | Probability & Statistics | 30 | 70 | 3 | 1 | 0 | 4 |
| 3 | J4109 | Concrete Technology | 30 | 70 | 3 | 0 | 0 | 3 |
| 4 | J4110 | Hydraulics & Hydraulic Machinery | 30 | 70 | 3 | 0 | 0 | 3 |
| 5 | | **Professional Elective - I** | | | | | | |
| | J4129 | Energy Sciences & Engineering | | | | | | |
| | 4130 | Solid Mechanics - II | 30 | 70 | 3 | 0 | 0 | 3 |
| | J4131 | Air & Noise Pollution and Control | | | | | | |
| 6 | J4111 | Concrete Technology Lab | 30 | 70 | 0 | 0 | 2 | 3 |
| 7 | J4112 | Surveying Lab - II | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 8 | J4113 | Fluid Mechanics & Hydraulic Machinery Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| | | **Total Credits** | | | **15** | **1** | **8** | **20** |
| 9 | JMC02 | Gender Sensitization | 100 | 0 | 2 | 0 | 0 | 0 |

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## COURSE STRUCTURE
(Applicable for the batches admitted from A.Y. 2018-2019 onwards)

### III YEAR - I SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | J5114 | Structural Analysis - I | 30 | 70 | 3 | 0 | 0 | 3 |
| 2 | J5115 | Design of Reinforced Concrete Structures | 30 | 70 | 3 | 1 | 0 | 4 |
| 3 | J5116 | Highway Engineering | 30 | 70 | 3 | 0 | 0 | 3 |
| 4 | J5132<br>J5133<br>J5134 | **Professional Elective - II**<br>Building Material, Construction & Planning<br>Advanced Concrete Technology<br>Watershed Management | 30 | 70 | 3 | 0 | 0 | 3 |
| 5 | | **Open Elective - I** | 30 | 70 | 3 | 0 | 0 | 3 |
| 6 | J5117 | Highway Material Testing Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 7 | J5118 | Computer Aided Civil Engineering Drawing | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 8 | J5180 | Internship | 100 | 0 | 0 | 2 | 1 | |
| | | **Total Credits** | | | **15** | **1** | **8** | **20** |
| 9 | JMC03 | Constitution of India | 100 | 0 | 2 | 0 | 0 | 0 |

### III YEAR - II SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | J6119 | Geotechnical Engineering | 30 | 70 | 3 | 0 | 0 | 3 |
| 2 | J6120 | Irrigation Engineering & Hydraulic Structures | 30 | 70 | 3 | 0 | 0 | 3 |
| 3 | J6121 | Engineering Geology & Rock Mechanics | 30 | 70 | 2 | 0 | 0 | 2 |
| 4 | J6122 | Design of Steel Structures | 30 | 70 | 3 | 0 | 0 | 3 |
| 5 | J6135<br>J6136<br>J6137 | **Professional Elective - III**<br>Structural Analysis - II<br>Traffic Engineering & Management<br>Earthquake Engineering | 30 | 70 | 3 | 0 | 0 | 3 |
| 6 | | **Open Elective - II** | 30 | 70 | 3 | 0 | 0 | 3 |
| 7 | J6123 | Geotechnical Engineering Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 8 | J6124 | Engineering Geology Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| | | **Total Credits** | | | **17** | **0** | **6** | **20** |

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## COURSE STRUCTURE
(Applicable for the batches admitted from A.Y. 2018-2019 onwards)

### IV YEAR - I SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | J7125 | Estimation and Costing | 30 | 70 | 2 | 0 | 0 | 2 |
| 2 | J7126 | Environmental Engineering | 30 | 70 | 3 | 0 | 0 | 3 |
| 3 | | **Professional Elective - IV** | | | | | | |
| | J7138 | Foundation Engineering | | | | | | |
| | J7139 | Railway & Airport Engineering | 30 | 70 | 3 | 0 | 0 | 3 |
| | J7140 | Pre Stressed Concrete Structures | | | | | | |
| 4 | | **Professional Elective - V** | | | | | | |
| | J7141 | Repairs & Rehabilitation of Structures | | | | | | |
| | J7142 | Advanced Structural Design | 30 | 70 | 3 | 0 | 0 | 3 |
| | J7143 | Earth Retaining Structures | | | | | | |
| 5 | | **Open Elective - III** | 30 | 70 | 3 | 0 | 0 | 3 |
| 6 | J7127 | Environmental Engineering Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 7 | J7128 | Structural Engineering Detailing Lab | 30 | 70 | 0 | 0 | 3 | 1.5 |
| 8 | J7181 | Mini Project | 100 | 0 | 0 | 0 | 6 | 3 |
| | | **Total Credits** | | | **14** | **0** | **12** | **20** |

### IV YEAR - II SEMESTER

| S.No. | Subject Code | Subject | Marks | | L | T | P | Credits |
|---|---|---|---|---|---|---|---|---|
| | | | Internal | External | | | | |
| 1 | | **Professional Elective - VI** | | | | | | |
| | J8144 | Construction Planning & Project Management | | | | | | |
| | J8145 | Industrial Waste Water Treatment | 30 | 70 | 3 | 0 | 0 | 3 |
| | J8146 | Solid & Hazardous Waste Management | | | | | | |
| | | **Professional Elective - VII** | | | | | | |
| 2 | J8147 | Ground Improvement Techniques | | | | | | |
| | J8148 | Finite Element Method | 30 | 70 | 3 | 0 | 0 | 3 |
| | J8149 | Bridge Engineering | | | | | | |
| 3 | | **Open Elective - IV** | | | | | | |
| 4 | J8182 | Technical Seminar - I | 100 | 0 | 0 | 0 | 2 | 1 |
| 5 | J8183 | Comprehensive Viva | 100 | 0 | 0 | 0 | 4 | 2 |
| 6 | J8184 | Major Project | 30 | 70 | 0 | 0 | 16 | 8 |
| | | **Total Credits** | | | **9** | **0** | **22** | **20** |
| 7 | J8185 | **NSS*** | -- | -- | 0 | 0 | 0 | 2* |

**NSS* - As per Academic Regulations, Item No. 1 (iii)**

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## LIST OF OPEN ELECTIVES SUBJECTS

| S. No. | Subject Code | Subject |
|---|---|---|
| 1 | J_150 | Remote Sensing & GIS |
| 2 | J_151 | Traffic Engineering and Transportation Planning |
| 3 | J_152 | Disaster Preparedness & Planning |
| 4 | J_153 | Environmental Imapact Assessment |
| 5 | J_219 | Control Systems |
| 6 | J_223 | Renewable Energy Sources |
| 7 | J_224 | Energy Storage Systems |
| 8 | J_238 | Industrial Electricals Systems |
| 9 | J_249 | Electrical Engineering Materials |
| 10 | J_250 | Neural Networks & Fuzzy Logic |
| 11 | J_351 | Basic Mechanical Engineering |
| 12 | J_352 | Applied Mechanics |
| 13 | J_353 | Material Science |
| 14 | J_354 | Basics of Thermodynamics |
| 15 | J_355 | Strength of Materials |
| 16 | J_356 | Modeling and Simulation of manufacturing systems |
| 17 | J_357 | Mechatronics |
| 18 | J_358 | Finite Element Analysis |
| 19 | J_359 | Nano Technology |
| 20 | J_402 | Signals and Systems |
| 21 | J_409 | Digital System Design |
| 22 | J_410 | Electromagnetic Waves and Transmission Lines |
| 23 | J_414 | IC Applications |
| 24 | J_415 | Digital Signal Processing |
| 25 | J_418 | Bio Medical Electronics |
| 26 | J_419 | Computer Organization |
| 27 | J_422 | Linear Control Systems |
| 28 | J_424 | Microprocessors and Microcontrollers |
| 29 | J_434 | Image and Video Processing |
| 30 | J_437 | Embedded Systems |
| 31 | J_447 | Wireless Sensor Networks |

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## LIST OF OPEN ELECTIVES SUBJECTS

| S. No. | Subject Code | Subject |
|---|---|---|
| 32 | J_454 | Microprocessors and Interfacing |
| 33 | J_456 | Digital Image Processing |
| 34 | J_518 | Database Management Systems |
| 35 | J_528 | Computer Networks |
| 36 | J_529 | Machine Learning |
| 37 | J_538 | Data Mining |
| 38 | J_539 | Cryptography & Network Security |
| 39 | J_547 | Cloud Computing |
| 40 | J_551 | INternet of Things (loT) |
| 41 | J_553 | Soft Computing |
| 42 | J_555 | Data Science & Big Data Analytics |
| 43 | J_556 | Natural Language Processing |
| 44 | J_559 | Semantic Web & Social Networks |
| 45 | J_560 | E-Commerce |
| 46 | J_E01 | Management Science |
| 47 | J_E02 | Managerial Economics and Financial Analysis |
| 48 | J_E03 | Total Quality Management |
| 49 | J_E04 | Global Marketing |
| 50 | J_E05 | Green Marketing |
| 51 | J_E06 | Intellectual Property Rights |
| 52 | J_E07 | Supply Chain Management |
| 53 | J_E08 | Statistical Quality Control |
| 54 | J_E09 | Financial Statement Analysis and Reporting |
| 55 | J_E10 | Micro Small Medium Enterprises Management |
| 56 | J_E11 | Entrepreneurship Development |
| 57 | J_E12 | Organizational Behaviour |
| 58 | J_E13 | Industrial Management |
| 59 | J_E14 | Production and Operations Management |
| 60 | J_E15 | Economic Policies of India |

***Note : '_' represents the applicable semester code***

***Note : The syllabus of Open Elective subjects is kept available in the Departments and website***

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J1001) MATHEMATICS - I

**B.Tech I-Year I-Semester** **L T P C**
**3 1 0 4**

**Pre-requisites:** Mathematical Knowledge at pre-university level

***Objectives:*** The Students able to learn

1. Types of matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form.
4. Concept of Sequence.
5. Concept of nature of the series.
6. Geometrical approach to the mean value theorems and their application to the mathematical problems.
7. Evaluation of surface areas and volumes of revolutions of curves.
8. Evaluation of improper integrals using Beta and Gamma functions.
9. Partial differentiation, concept of total derivative Finding maxima and minima of function of two and three variables.

**UNIT-I**

**Matrices:** Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss-elimination method; Gauss Seidel Iteration Method.

**UNIT-II**

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

**UNIT-III**

**Sequence**: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.

**Series:** Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

**UNIT-IV**

**Calculus:** Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

**UNIT-V**

**Multivariable calculus (Partial Differentiation and applications):** Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence &independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

***Text books :***

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36thEdition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley &Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint, 2002.

***References :***

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, LaxmiPublications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,11thReprint, 2010.

***Outcomes*** **:** After learning the contents of this paper the student must be able to

1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
2. Find the Eigenvalues and Eigen vectors.
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Analyse the nature of sequence and series.
5. Solve the applications on the mean value theorems.
6. Evaluate the improper integrals using Beta and Gamma functions. Find the extreme values of functions of two variables with/ without constraints.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J1007) ENGINEERING PHYSICS

**B.Tech I-Year I-Semester** **L T P C**

**3 1 0 4**

**Objectives :**

1. Enable the student to connect the historical development of quantum mechanics and learn the basic principles of quantum mechanics and employs the Bloch's theorem to draw the band structure of solids on the basis of Kronig Penny model.
2. The students learn basic theory of semiconductors and principles and operations of optoelectronic devices.
3. The Students to understand the basic properties of light, Concepts of LASER and it's engineering applications.
4. Enable the students to learn the basic principles of dielectrics, magnetic superconductors and their engineering applications.
5. Enable the students to learn about the types of oscillation, mechanics, which helps in analyzing and solving the engineering problems.

**UNIT-I**

**Quantum Mechanics:** Introduction to quantum mechanics**,** Wave nature of the particle, de-Broglie's hypothesis, Davisson and Germer's experiment, GP Thompson experiment, Heisen berg's uncertainty principle, Schrodinger time independent wave equation, Particle in one dimensional box.

**Band theory of Solids:** Electron in periodic potential – Bloch theorem**,** Kronig–Penny Model, Brillion zone concept, Effective mass of an electron, Origin of energy band formation-Classification of materials.

**UNIT-II**

**Semiconductor Physics:** Introduction to intrinsic and extrinsic semiconductors, Carrier concentration in conduction band and valancy band of intrinsic and extrinsic semiconductor, Fermi level, Effect of carrier concentration and temperature on Fermi level, Hall Effect- Applications of semiconductors.

**Semiconductor Optoelectronics**: Radative and Non-radative recombination mechanisms in semiconductors, Formation of PN junction diode-V-I characteristics, Zener diode - characteristics, Solar cell and LED- Construction and working mechanism.

**UNIT-III**

**Optics**: Huygens' principle, Superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment,

Newton's rings, Michelson interferometer, Farunhofer diffraction from a single slit, Diffraction grating and resolving power.

**Lasers** :Introduction-characteristics of lasers, absorption, spontaneous emission, stimulated emission, Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, Ruby laser, He-Ne laser, Semiconductor diode laser, applications of lasers in science, Engineering and Medicine.

**UNIT-IV**

**Dielectric Materials:** Introduction-Types of Polarizations, derivation for electronic and ionic polarizabilities, internal fields in solids, Clausius Mossotti equation, Ferro electricity, structure of $BaTiO_3$, piezo-electricity.

**Magnetic Materials**: Introduction-origin of magnetic moment, Bohr Magneton, classification of Dia, Para and Ferro magnetic materials, Hysteresis curve, Soft and hard magnetic materials; Superconductivity- properties, BCS theory, Type –I &II Superconductors-Applications.

**UNIT-V**

**Oscillations, waves**: Simple harmonic motion, Damped and forced simple harmonic oscillator, damped harmonic oscillator – heavy, critical and light damping quality factor, forced mechanical oscillators, mechanical impedance, steady state motion of forced damped harmonic oscillator.

**Mechanics:** Motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinate system rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler's laws of motion, their independence from Newton's laws, and their necessity in describing rigid body motion.

**Text Books :**

1. Introduction to Quantum Physics-Eisberg and Resnick.
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc.
3. H.J. Pain, The Physics of vibrations and waves.
4. Quantum Mechanics- Decker.
5. Ian G. Main, Oscillations and waves in physics.

**Reference :**

1. Engineering Physics, P.K Palanisamy, Scitech Publications.

2. Applied Physics- Dr. N Chandra Shaker and P. Appal Naidu.
3. Applied Physics for Engineers- P. Madhusudana rao, Academic Publishing Company.
4. Engineering Physics, V. Rajandran, Tata mc. Graw Hill Book Publishers.
5. Introduction to Mechanics — MK Verma.

**Outcomes :**

1. The student learns about solving engineering solutions employing the quantum mechanical concepts.
2. The students learns about the physics of semiconductor materials and along with their applications in science and engineering.
3. The student learns about the construction, working and applications of LASER in engineering.
4. The students get exposure to dielectric and magnetic materials and their engineering applications.
5. The students learn about theory of waves and oscillation and mechanics of rigid bodies for engineering applications.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J1008) ENGINEERING CHEMISTRY

**B.Tech I-Year I-Semester** **L T P C**
**3 1 0 4**

**Objectives :**

1. To achieve the knowledge about various kinds of Orbitals & Splitting patterns.
2. To know about the water quality and its parameters, learning the knowledge in the assessment of water quality and purification.
3. To achieve the knowledge about various kinds of Electrochemical cells and batteries and corrosion phenomenon.
4. To understand the reactions, mechanism and stereochemistry of organic molecules.
5. Understand the principle, instrumentation and applications of Spectroscopic techniques.

**UNIT-I**

**Molecular structure and Theories of Bonding:** Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of $N_2$,$O_2$ and $F_2$ molecules. ð molecular orbitals of butadiene and benzene.

**Crystal Field Theory (CFT**): Salient Features of CFT – Crystal Field Splitting of transition metalion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

**UNIT-II**

**Water and its treatment:** Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

**UNIT-III**

**Electrochemistry and corrosion:** Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications.

Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery). 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 and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

**UNIT-IV**

**Stereochemistry, Reaction Mechanism and synthesis of drug molecules:** Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation alanalysis of n- butane. Substitution reactions: Nucleophilic substitution reactions: Mechanism of $S_N1$, $S_N2$ reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$ and chromic acid. Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$& $NaBH_4$. Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

**UNIT-V**

**Spectroscopic techniques and applications:** Principles of spectroscopy, selection rules and applications of electronic spectroscopy. vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

**Text books :**

1. Text Book of Engineering Chemistry by A.Jayashree, Wiley publications, New Delhi.
2. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi (2010).
3. Text Book of Engineering Chemistry by Shashi Chawla.
4. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016).
5. Text Book of Engineering Chemistry by C. Parameshwara Murthy. B.S. Publications.
6. Text Book of Engineering Chemistry by Y. Bharathi kumari and Jyotsna Cherikuri, VGS Publications.

**Outcomes :**

1. Students will gain the basic knowledge of atomic and molecular orbitals & Splitting patterns.
2. They can understand the basic properties of water and its usage in domestic and industrial purposes.
3. To gain the knowledge about the Electrochemical cells, batteries and corrosion phenomenon.
4. They learn about organic reactions and the stereochemistry of organic molecules. They can predict potential applications of spectroscopy and practical utility in order to become good engineers and entrepreneurs.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J1301) ENGINEERING MECHANICS

**B.Tech I-Year I-Semester** **L T P C**

**3 1 0 4**

**Objectives:** The objectives of this course are to

1. Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium.
2. Perform analysis of bodies lying on rough surfaces.
3. Locate the Centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections.
4. Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
5. Explain the concepts of work-energy method and its applications to translation, rotation and plane motion and the concept of vibrations.

**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, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy.

**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.

**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.

**UNIT-III**

**Area Moment of Inertia**- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, 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-IV**

Review of particle dynamics- Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and

constrained motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

**UNIT-V**

Kinetics of Rigid Bodies -Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation.

**Text Books :**

1. Engg. Mechanics / S.S. Bhavikatti & K.G. Rajasekharappa / Third edition / New age International Publishers.
2. Reddy Vijay Kumar K. and J. Suresh Kumar (2010), Singer's Engineering Mechanics – Statics & Dynamics.

**Reference :**

1. Timoshenko S.P and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 1983.
2. Andrew Pytel, Jaan Kiusalaas, "Engineering Mechanics", Cengage Learning, 2014.
3. Beer F.P & Johnston E.R Jr. Vector, "Mechanics for Engineers", TMH, 2004.
4. Hibbeler R.C & Ashok Gupta, "Engineering Mechanics", Pearson Education, 2010.
5. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
6. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2008.
7. Meriam. J. L., "Engineering Mechanics", Volume-II Dynamics, John Wiley & Sons, 2008.

**Outcomes :** At the end of the course, graduates will be able to

1. Determine resultant of forces acting on a body and analyze 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 calculate moment of inertia of a given section.
4. Evaluate the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
5. Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J1009) ENGINEERING PHYSICS AND CHEMISTRY LAB

**B.Tech I-Year I-Semester** **L T P C**

**0 0 3 1.5**

**Objectives :**

This course on Physical Sciences lab has been designed with 18 experiments in Physics and Chemistry. The objective of the course is that the student will have exposure to various experimental skills which is very essential for an engineering student. The experiments are selected from various areas of physics and chemistry like Physical Optics, Lasers, Fiber optics, waves and oscillations, semiconductors, Electricity, Conductometry, Potentiometry, etc... The student is also exposed to various tools like Screw Gauge, Vernier callipers, Physical balance, Spectrometer, Microscope, Viscometer, and stalagmometer, etc.

**PHYSICS LAB (CYCLE-1)**

(Any Six Experiments compulsory)

1. Determination of Eenergy gap of semiconductor material of p-n junction diode.
2. Determination of frequency of electrical vibrator by using Melde's experiment.
3. Determination of wavelength of LASER by using diffraction grating.
4. Determination of rigidity modulus of a given wire using Torsional pendulum.
5. R-C circuit analysis.
6. Determination of Numerical aperture of a given optical fiber.
7. Determination of the radious of curvature of plano-convex lens by forming Newton's rings.
8. LED-characteristics .

**CHEMISTRY LAB (CYCLE -2) (Any six Experiments)**

1. Determination of total hardness of water by complexometric method using EDTA.
2. Estimation of an HCl by Conductometric titrations.
3. Estimation of Acetic acid by Conductometric titrations.
4. Estimation of HCl by Potentiometric titrations.
5. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
6. Synthesis of Aspirin and Paracetamol.
7. Thin layer chromatography calculation of $R_f$ values. egortho and para nitro phenols.
8. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal.
9. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
10. Determination of surface tension of a give liquid using stalagmometer.

**Laboratory Manuals:**

1. Laboratory Manual Of Engineering Physics By Dr. Y.Aparna And Dr K. Venkateswara Rao (V.G.S Publishers).
2. Practical Engineering Chemistry by K. Mukkanti, etal' B'S' Publications, Hyderabad.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J1303) ENGINEERING WORKSHOP LAB

**B.Tech I-Year I-Semester** **L T P C**

**1 0 3 2.5**

**Objectives:**

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.

**Demonstration:** Plumbing, Power tools: Power hacksaw, Table mounted circular saw, Thickness planer, Bench drilling machine.

**Workshop Practice:** (Two exercises are required to perform from each trade)

1. Fitting**.**
2. Carpentry**.**
3. Tin Smithy**.**
4. House wiring**.**
5. Black Smithy.
6. Foundry.
7. Welding.

**Text Books :**

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech.
2. Workshop Manual / K. Venugopal / Anuradha.

**Reference :**

1. Workshop Practice /B. L. Juneja / Cengage.
2. Workshop Manual / Venkat Reddy/ BSP.

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

1. Study and practice on machine tools and their operations.
2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry and house wiring.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J2002) MATHEMATICS - II

**B.Tech I-Year II-Semester** **L T P C**

**3 1 0 4**

**Pre-requisites:** Mathematical Knowledge at pre-university level

**Objectives:** The Students able to learn

1. Methods of solving the differential equations of first and higher order.
2. Evaluation of multiple integrals and their applications.
3. The physical quantities involved in engineering field related to vector valued functions.
4. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

**UNIT-I**

**First Order ODE:** Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

**UNIT-II**

**Ordinary Differential Equations of Higher Order:** Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type $e^{ax}$, Sinax, Cosax, polynomials in, x, $e^{ax}v(ax)$ and xv(x); method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

**UNIT-III**

**Multivariable Calculus (Integration):** Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

**UNIT-IV**

**Vector Differentiation:** Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

**UNIT-V**

**Vector Integration:** Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

**Text Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley &Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition,Pearson, Reprint, 2002.

**References :**

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes.
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

**Outcomes:** After learning the contents of this paper the student must be able to

1. Identify whether the given differential equation of first order is exact or not.
2. Solve higher differential equation and apply the concept of differential equation to real world problems.
3. Evaluate the multiple integrals and apply the concept to find areas and volumes. Evaluate the line, surface and volume integrals and converting them from one to another.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J2011) ENGLISH

**B.Tech I-Year II-Semester** **L T P C**

**2 0 0 2**

**Introduction :**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

**Objectives:** The course will help to

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

**UNIT –I**

**'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

**Vocabulary Building**: The Concept of Word Formation —The Use of Prefixes and Suffixes.

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

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

**Basic Writing Skills:** 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**

**'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

**Vocabulary:** Synonyms and Antonyms.

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

**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension

**Writing:** Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

**UNIT –III**

**'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

**Vocabulary**: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-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- Skimming and Scanning.

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

**UNIT –IV**

**'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

**Vocabulary**: Standard Abbreviations in English.

**Grammar:** Redundancies and Clichés in Oral and Written Communication.

**Reading**: Comprehension**-** Intensive Reading and Extensive Reading.

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

**UNIT –V**

**'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**
**Vocabulary**: Technical Vocabulary and their usage.

**Grammar:** Common Errors in English.

**Reading:** Reading Comprehension-Exercises for Practice.

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

**Text Books :**

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

**References :**

2. Swan, M. (2016). Practical English Usage. Oxford University Press.
3. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
4. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
5. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
6. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
7. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

**Outcomes:** Students should be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J2202) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

**B.Tech I-Year II-Semester**

| L | T | P | C |
|---|---|---|---|
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**Objectives :**

1. To understand the concepts of Basis Electrical Engineering parameters, quantities, and network theorems.
2. To analyze the steady state analysis of AC and DC circuits.
3. To Study the construction operation and analysis of transformers, DC and AC machines.
4. To Study the Operational Characteristics of Diodes and Rectifier Circuits.
5. To Study the Operational Characteristics of transistor, characteristics and its applications.

**UNIT- I**

**Electrical Circuits:** Circuits concept, R-L-C Parameters, Voltage and Current sources, Source Transformation, V–I relationship for Passive elements, Kirchoff's Laws, Network reduction techniques – series, parallel, series parallel, star/delta transformations, Nodal Analysis, Mesh analysis with DC excitations.

**Network Theorems** - Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity Theorems with DC excitation.

**UNIT- II**

**Single Phase AC Circuits -** R.M.S. and Average values, Form Factor, steady state analysis of series, Parallel and Series parallel Combinations of R, L and C with Sinusoidal excitation, concept of reactance, Impedance, Susceptance and Admittance – phase and phase difference, Concept of Power Factor, j-notation, complex and Polar forms of representation.

**UNIT- III**

**D.C.Machines**: Constructional features, Methods of Excitation, E.M.F. Equation and Applications, Torque development in D.C motor, Characteristics of DC motors, losses, Efficiency, Swinburne's test, Speed control of DC Shunt motors.

**Single Phase Transformers**: Construction and principle of operation, Development of No Load & On Load Phasor diagrams (Basic fundamentals only).

**3-Phase Induction Motor**: Constructional features, Principle of Operation (Basic fundamentals only).

**UNIT- IV**

**P-N Junction Diode** – Qualitative theory of P-N Junction, P-N Junction diode, V-I characteristic(Forward and Reverse), Temperature dependence, Ideal versus practical, Static and dynamic resistances.

**Rectifiers and Filters -** The P-N junction as a rectifier - A Half Wave Rectifier, Ripple Factor, Full Wave Rectifier, Bridge Rectifier, Filters-Inductive and Capacitive with qualitative analysis.

**UNIT- V**

**Bipolar Junction Transistor (BJT) -** Construction, Principle of Operation, CB, CE and CC configurations.

**Junction Field Effect Transistor** - Construction, Principle of Operation, V-I Characteristic, Comparison of BJT and FET.

**Zener Diode and SCR Devices-** Zener diode characteristics, Use of Zener diode as simple regulator, Breakdown Mechanisms in Zener diode, Principle of Operation of SCR.( Basic fundamentals only).

**Text Books :**

1. Electronic Devices and Circuits – R.L. Boylston and Louis Nashelsky, PEI/ PHI, 9th Ed, 2006.
2. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
3. Electrical Machines – by P.S.Bimbra.

**References :**

1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
2. Electronic Devices and Circuits -- K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
3. Electrical Machines – by J.B.Gupta.
4. Network Theory by N.C.Jagan & C.Lakshminarayana, B.S. Publications. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J2302) ENGINEERING GRAPHICS

**B.Tech I-Year II-Semester** **L T P C**
**1 0 4 3**

**Objectives :**

1. To Use various engineering drawing instruments along with learn the basics of drawings, dimensioning, scales and conic sections like ellipse, parabola and hyperbola.
2. To Learn projections of points, lines and plane viewed in different positions.
3. To Learn projections of solids and sections of solids in different positions.
4. To impart knowledge of development of surfaces and intersections is most useful of real time applications in industry.
5. Attain the concept of isometric, orthographic projections.

**UNIT – I**

**Introduction to Engineering Drawing:** Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

**UNIT- II**

**Orthographic Projections:** Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

**UNIT – III**

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.

**UNIT – IV**

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder.

**UNIT – V**

**Isometric Projections:** Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions.

**Introduction to CAD: (For Internal Evaluation Weightage only):** Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package.

**Text Books :**

1. Engineering Drawing N.D. Bhatt / Charotar.
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford.

**Reference :**

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill.
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers.

**Outcomes :**

1. Select, construct and interpret appropriate drawing scales as per the situation and able to draw simple curves.
2. Graduates are able to draw orthographic projections of points ,lines and planes.
3. Able to draw the orthographic projections of solids and sections of solids.
4. Layout development of solids for practical situations along with able to draw sections of solids.
5. Comprehend the isometric projections.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J2501) PROGRAMMING FOR PROBLEM SOLVING

**B.Tech I-Year II-Semester** **L T P C**
**3 1 0 4**

**Objectives :**

1. To introduces the basics of computers and information technology.
2. To educate problem solving techniques.
3. To impart programming skills in C language.
4. To practice structured programming to solve real life problems.
5. To study the concepts of Assembler, Macro Processor, Loader and Linker.

**UNIT-I**

History and Classifications of Computers – Components of a Computer – Working Principle of Computer – Hardware – Software and its Types – Applications of Computers –Network and its Types – Internet and its services – Intranet– Extranet – Generations of Programming Languages Introduction to Number System.

**UNIT-II**

Problem solving techniques – Program development life-cycle – Algorithm – Complexities of Algorithm – Flowchart – Pseudo code. Introduction to C –C Program Structure – C tokens: Keyword, Identifiers, Constants, Variable, Data types (simple and user-defined) – Operators and its types – Operator Precedence – Expression Evaluation – Type Conversion – Input/output operations.

**UNIT-III**

Branching Statements – Looping Statements – Arrays – Multidimensional arrays. Functions: Function Prototype, Passing Arguments to Function – Call by Value and Call by Reference – Nested function call – Library Functions – User-defined Functions – Recursion. Strings – String I/O functions, String Library functions – Storage classes.

**UNIT-IV**

Structures – Arrays and Structures – Nested structures – Structure as Argument to functions– Union Pointers – Declaration, Initialization and Accessing Pointer variable – Pointers and arrays – pointers as argument and return value – Pointers and strings - pointers and structures.

**UNIT-V**

Introduction to File Concepts in C – File types – I/O operations on files – File modes – Random access to files – Command line arguments. Dynamic Memory Allocation: MALLOC, CALLOC, FREE, REALLOC Introduction to preprocessor – Macro substitution directives – File inclusion directives –Compiler Control directives – Miscellaneous directives.

**Text Books :**

1. J. B. Dixit, "Computer Fundamentals and Programming in C", Firewall Media, 2009.
2. Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, Sixth edition, 2012.

**Reference :**

1. Ashok N Kamthane, "Computer Programming", Pearson education, Second Impression, 2008.
2. Venugopal.K and Kavichithra.C, "Computer Programming", New Age International Publishers, First Edition, 2007.
3. Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
4. Dromey R.G., "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007.
5. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006.

**Outcomes :**

1 Know the fundamentals of computers.

2 Uunderstand applying logical skills for problem solving.

3 Learn C programming language concepts.

4 Apply C programming language concepts for problem solving.

5 Gain knowledge in using memory management techniques in c programming.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J2203) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

**B.Tech I-Year II-Semester**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**List of Experiments :**

1. Verification of Kirchhoff's Laws.
2. Verification of superposition and Reciprocity Theorems.
3. Verification of Maximum Power transfer theorem.
4. Experimental Determination of Thevenin's theorem.
5. Magnetization characteristics of DC Shunt Generator.
6. Swinburne's Test on DC shunt machine.
7. Brake test on DC shunt motor.
8. OC & SC tests on single phase transformer.
9. PN Junction Diode characteristics (Forward bias, Reverse bias).
10. Zener Diode Characteristics.
11. Transistor CE Characteristics (Input and Output).
12. Rectifier without filters (Full wave & Half wave).
13. Rectifier with filters (Full wave & Half wave).

**Note: Student should perform 11 experiments out of 13 experiments. Experiments 7 & 8 are optional.**

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J2502) PROGRAMMING FOR PROBLEM SOLVING LAB

**B.Tech I-Year II-Semester** **L T P C**

**0 0 3 1.5**

**Objectives :**

1 To study and understand the use of OS commands.

2 To expose the undergraduate students to the practical implementation of C Programming concepts.

3 To improve students capability in applying C Programming for problem solving.

4. To make students use effective memory management techniques in programming.

5. To expose students to modular programming concepts in problem solving.

**List of Experiments:**

**Week 1:** Study of OS commands.

**Week 2:** Study of Compilation and execution of simple C programs.

**Week 3:** Basic C Programs.

a.Arithmetic Operations.

b. Area and Circumference of a circle.

c. Swapping with and without Temporary Variables.

**Week 4:** Programs using Branching statements.

a. To check the number as Odd or Even.

b. Greatest of Three Numbers.

c. Counting Vowels.

d. Grading based on Student's Mark.

**Week 5:** Programs using Control Structures.

a. Computing Factorial of a number.

b. Fibonacci Series generation.

c. Prime Number Checking.

d. Computing Sum of Digit.

**Week 6:** Programs using String Operations.

a. Palindrome Checking.

b. Searching and Sorting Names.

**Week 7**: Programs using Arrays

**Week 8**: Programs using Functions.

a. Computing nCr.

b. Factorial using Recursion.

c. Call by Value and Call by Reference

**Week 9:** Programs using Structure.

a. Student Information System.

b. Employee Pay Slip Generation.

c. Electricity Bill Generation

**Week 10:** Programs using Pointers.

a. Pointer and Array.

b. Pointer to function.

c. Pointer to Structure

**Week 11:** Programs using File Operation.

a. Counting No. of Lines, Characters and Black Spaces.

b. Content copy from one file to another.

c. Reading and Writing Data in File

**Text Books:**

1. J. B. Dixit, "Computer Fundamentals and Programming in C", Firewall Media, 2009.
2. Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, Sixth edition, 2012.

**Outcomes:**

1. Learn practical implementation of C programming language concepts.
2. Debug and document programs in C.
3. Know usage of logical skills in developing C programs.
4. Apply effective memory management techniques for problem solving.
5. Understand the file management techniques.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J2012) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

**B.Tech I-Year II-Semester** **L T P C**

**0 0 2 1**

The **Language Lab** focuses on the production and practice of sounds of language. It familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

**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 of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence.
5. To train students to use language appropriately for public speaking, group discussions and interviews.

**The language Lab shall have two parts:**

Computer Assisted Language Learning (CALL) Lab.

Interactive Communication Skills (ICS) Lab.

**Listening Skills :**

**Objectives:**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions**.**
3. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
4. Listening for general content.
5. Listening to fill up information.
6. Intensive listening.
7. Listening for specific information.

**Speaking Skills:**

**Objectives:**

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.
3. Oral practice.
4. Describing objects/situations/people.
5. Role play.
6. Just A Minute (JAM) Sessions.

**Reading Skills :**

**Objectives :**

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
3. Skimming and Scanning the text.
4. Understanding the gist of an argument.
5. Identifying the topic sentence.
6. Inferring lexical and contextual meaning.
7. Understanding discourse features.

**Note:** The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/ newspaper articles.

**Writing Skills :**

**Objectives:**

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones. Writing sentences.
3. Use of appropriate vocabulary.
4. Paragraph writing.
5. Coherence and cohesiveness.
6. Narration / description.
7. Note Making.
8. Formal and informal letter writing.
9.

**The following course content is prescribed for the Lab.**

**Exercise – I**

**CALL Lab**:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

**ICS Lab**:

Understand: Communication at Work Place- Spoken vs. Written language.
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 and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

**ICS Lab**:

Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

**Exercise - III**

**CALL Lab:**

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

**ICS Lab**:

Understand: How to make Formal Presentations.

Practice: Formal Presentations.

**Exercise – IV**

**CALL Lab**:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

**ICS Lab**:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech – Extempore.

**Exercise – V**

**CALL Lab:**

Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.

**ICS Lab**:

Understand: Interview Skills.

Practice: Mock Interviews.

**Minimum Requirement of infrastructural facilities for ELCS Lab:**

1. **Computer Assisted Language Learning (CALL) Lab** has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

**System Requirement (Hardware component):**

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration.

ii) High Fidelity Headphones.

2. **Interactive Communication Skills (ICS) Lab:** A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

**Lab Manuals**:

1. ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities. Hyderabad, Orient Black Swan Pvt. Ltd. 2016. Print.
2. Hart, Steve. Nair, Aravind R. and Bhambhani, Veena. EMBARK- English for Undergraduates. Delhi. Cambridge University Press. 2016. Print.

**Suggested Software:**

1. Cambridge Advanced Learner's dictionary with CD, Fourth edition.
2. Oxford Advanced Learner's Compass, 8th Edition, with CD.
3. Hancock, Mark. English Pronunciation in Use: Intermediate. United Kingdom. Cambridge University Press, 2007.
4. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).

**References :**

1. Mohanraj, Jayashree. Let Us Hear Them Speak. New Delhi: Sage Texts. 2015. Print.
2. Hancock, M. English Pronunciation in Use. Intermediate Cambridge. Cambridge University Press. 2009. Print.

**Outcomes :** Students will be able to attain

1. Better understanding of nuances of English language through audio- visual experience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking skills with clarity and confidence which in turn enhances their employability skills.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J3101) INTRODUCTION TO CIVIL ENGINEERING

**B.Tech II-Year I-Semester** **L T P C**
**3 0 0 3**

**Objectives :**

This course will develop students' knowledge in/on

1. Over view of Civil engineering and historical aspect of civil engineering.
2. Over view of national planning and town planning.
3. Fundamentals of Building Materials and its uses.
4. Fundamental of geotechnical and environmental engineering and its application.
5. Basics of Traffic and transportation engineering.

**UNIT-I**

**Basic Understanding:** What is Civil Engineering / Infrastructure? Basics of Engineering and Civil Engineering; Broad disciplines of civil engineering, Importance of civil engineering and Possible Scope for a career.

**History of Civil Engineering:** Early Constructions and developments over time; Ancient monuments and Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers.

**UNIT-II**

**Overview of National Planning for Construction and Infrastructure Development**: Position of Construction Industry vis-à-vis other industries, Five Year plan outlays for construction; current budget for infrastructure works.

**Fundamentals of Architecture & Town Planning:** Aesthetic in civil engineering, Examples of great architecture, Fundamental of architecture design and town planning; Building Systems (HVAC, Acoustics, Lighting, etc); LEED ratings; Development of Smart Cities.

**UNIT-III**

**Fundamental of Building Materials:** Stones, Bricks, Mortar, Plain, Reinforced Concrete & Pre Stressed Concrete, Construction Chemicals; Structural Plastics in Construction; 3D Printing; Recycling of Construction & Demolition wastes.

**UNIT-IV**

Steel and Aluminum : Types of Mild Steel, High Tensile Steel, Carbon Composites; Ferro Cement, FAL-G Brick, Plastics and geotextiles.

**Geotechnical Engineering:** Basics of Soil Mechanics, Rock Mechanics and Geology; Various types of Foundation.

**UNIT-V**

**Environmental Engineering & Sustainability:** Introduction to Water treatment systems; Effluent treatment systems; Solid waste management; sustainability in construction.

**Traffic & Transportation Engineering:** Investment in transport infrastructure development in india for different modes of transport; Development and challenges in integrated transport development in india.

**Text Books :**

1. Basic Civil Engineering by S.S.Bhavikatti.
2. S.K. Duggal, "Building materials", New Age international Pvt. Ltd., New Delhi.
3. L. R. Kadiyali, "Traffic Engineering and Transportation Planning" Khanna Publishers, 7th edn.
4. K.R. Arora, "Soil Mechanics and Foundation Engineering", Standard Publishers, New Delhi.
5. P.N.Modi, "Water supply Engineering- Environmental Engineering–I and II", Standard Book House., New Delhi.

**References :**

1. The National Building Code, BIS, (2017).
2. S.K Khanna, CEG Justo, A. Veeraraghavan, "Highway Engineering", Nem Chand and Bros.

**Outcomes :**

After completion of this course, students will be able to….

1. Know Civil engineering and historical aspect of civil engineering.
2. Understand national planning and town planning.
3. Know Fundamentals of Building Materials and its uses.
4. Know Fundamental of geotechnical and environmental engineering and its application.
5. Understand Basics of Traffic and transportation engineering.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J3102) CIVIL ENGINEERING - SOCIETAL AND GLOBAL IMPACT

**B.Tech II-Year I-Semester** **L T P C**
**3 0 0 3**

**Objectives:**

This course will develop students' knowledge in/on

1. Awareness of the importance of civil engineering and the impact on the society and global level.
2. Civil engineering infrastructures and its societal impact.
3. Awareness of the impact of civil engineering in the environmental field and Endeavour.
4. Awareness of the impact of civil engineering in the Built environmental Endeavour.
5. Global and Societal impact of civil engineering projects.

**UNIT-I**

**Introduction:** Understanding the past to look into the future: Pre-Industrial revolution days, Agriculture revolution, First and Second Industrial revolutions, IT revolutions; Recent major civil engineering breakthroughs and innovations; Present day world and future projections, Eco Systems in society and in Nature; The steady erosion in sustainability; Global warming its impact and possible causes; Evaluating future requirements for various resources; Ecological footprint of India Vs other countries and analysis. Understanding the importance of civil engineering in shaping and impacting the world; Future vision of civil Engineering.

**UNIT-II**

**Infrastructures:** Habitats, Megacities, Smart Cities, Futuristic Visions; Transportation ( Roads, Railways and Metros, Airports, Seaports, River Ways, Sea Canals, Tunnels(Below ground and under water) Futuristic Systems (Ex: Hyper Loop)); Energy Generation (Hydro, Solar( Photovoltaic; solar chimney), Wind, Wave, Tidal, Geothermal, Thermal Energy); Water Provisioning; Telecommunication needs( Towers, Above ground and underground cabling); Awareness of various course and standards governing infrastructure development; Innovations and methodologies for ensuring sustainability.

**UNIT-III**

**Environment:** Traditional and futuristic methods; Solid waste management, Water purification, Waste water treatment and recycling hazardous waste treatment; Flood Control (Dams, Canals, River interlinking); Multipurpose water

projects ; Atmospheric pollution; Global warming phenomena and pollution mitigation measures, Stationary and non stationary; Environmental metrics and monitoring; Other Sustainability measures; Innovations and methodologies for ensuring sustainability.

**UNIT-IV**

**Built Environment:** Facilities Management Climate Control; Energy efficient built environment and LEED ratings, Recycling, Temperature/Sound Control in built environment, Security systems; Intelligent/smart buildings; Aesthetic of built environment, Role of Urban arts commissions; Conservation, Repairs and Rehabilitation of Structures and Heritage Structures; Innovations and methodologies for ensuring sustainability.

**UNIT-V**

**Civil Engineering Projects:** Environmental impact analysis procedures; Waste (Materials, Manpower, Equipment) avoidance/Efficiency increase; Advanced construction techniques for better sustainability; Techniques for reduction of green house gas emissions in various aspect of civil engineering projects; New project management paradigms & systems ( Ex: Lean Construction), Contribution of civil engineering to GDP, Contribution to employment( Projects, facilities managements), Quality of products, Health and safety aspects for stake holders; Innovations and methodologies for ensuring sustainability during project development.

**Text Books :**

1. Ziga Turk, " Global Challenges and the role of civil engineering".
2. Barry M, " Corporate Social Responsibility".

**References:**

1. The National Building Code, BIS, (2017).
2. Papers published related to the topics in journals.
3. Relevant IS codes and Handbooks.

**Outcomes :**

After completion of this course, students will be able to….

1. Understand the importance of civil engineering and the impact on the society and global level.
2. Understand Civil engineering infrastructures and its societal impact.
3. Understand the impact of civil engineering in the environmental field and Endeavour.
4. Know the impact of civil engineering in the Built environmental Endeavour.
5. Know the Global and Societal impact of civil engineering projects.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J3103) SOLID MECHANICS - I

**B.Tech II-Year I-Semester** **L T P C**
**3 1 0 4**

**Objectives :**

This course will develop students' knowledge in/on

1. Behavior of bodies subjected to various types of stresses and the associated strains.
2. Shear force and bending moment for determinate beams.
3. Analyze the flexure stress and shear stress.
4. Stresses developed in short and long columns and methods to evaluate slope and deflection.
5. Apply the concept of pure torsion and different types of spring.

**UNIT-I**

**Simple Stresses and Strains:** Concept of Stress and Strain, St.Venant's Principle, Stress and Strain Diagram, 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. Relationship between elastic constants.

**Strain Energy**: Resilience-Gradual, Sudden, impact and shock loading-Simple Applications.

**UNIT-II**

**Shear Force and Bending Moment:** Definition of beam, Types of supports, classification of beams, Concept of Shear Force (SF) and Bending Moment (BM). BM and SF diagrams for cantilever simply supported and fixed beams with or without overhangs. Calculation of Max.BM and SF and the point of contra flexure under concentrated loads, uniformly distributed load over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments.

**UNIT-III**

**Flexure Stress:** 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 Section- Design of Simple beam sections.

**Shear Stress:** Derivation of formula-shear stress distribution across various beams section like rectangular, circular triangular, I,T angle sections**.,** Shear Centre**:** Introduction –Shear centre for symmetrical and unsymmetrical (channel,I,T and L) sections.

**UNIT-IV**

**Slope and Deflections:** Relationship between moment, slope and deflection, moment area method, Macaulay's method. Use of these methods to calculate slope and deflection for determinant beams.

**Columns and Struts:** Introduction- types of columns-Euler's theory, Euler's critical load for columns with various end conditions, Limitations, Rankine's hypothesis, IS Code formula, Critical load for eccentrically loaded columns, Empirical formulae- straight line formulae, Prof. Perry's Formula.

**UNIT-V**

**Torsion of Circular Shafts:** Theory of pure torsion in solid and hollow circular shafts, Derivation of torsion equation, assumption made in the theory of torsion, polar section modulus, combined bending and torsion and end thrust, Shear stresses, angle of twist, Power transmitted by shaft.

**Springs:** Introduction of springs, types of springs**,** Close-coiled and open-coiled helical spring subjected to axial load and axial twist, Springs in series, Springs in parallel, Strain energy in springs-carriage or leaf spring.

**Text Books :**

1. 1. Timoshenko and Gere, "Mechanics of Materials", PWS Publishing Company, Boston, 4th edn., 1997.
2. H.J.Shah and S.B. Junnarkar, "Mechanics of Structures Vol.-I. and Vol.-II", Charotar Publishing House Pvt. Ltd., Anand, 31st edn., 2014.
3. Kazmi S.M.A., " Solid Mechanics", TMH Delhi, India.

**References :**

1. Andrew Pytel and Ferdinand L. Singer, "Strength of Materials", Harper and Row Publishers, New York, 4th edn., 2011.
2. Ferdinand P Beer et al., "Mechanics of Materials", Tata McGraw Hill Education Pvt. Ltd.

**Outcomes :**

On completion of this course, students will be able to

1. Explicate the various types of stresses and the associated strains.
2. Compute the Shear force and bending moment for determinate beams.
3. Assess the Bending and shear stresses for beams in flexure.
4. Evaluate the stresses in long and short columns with various loading and boundary Conditions.
5. Explore the behavior of springs and circular shafts subjected to loading.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J3104) FLUID MECHANICS

**B.Tech II-Year I-Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

1. Identify and obtain values of fluid properties and relationship between them.
2. Understand the fluid kinematics and dynamics.
3. Understand the principles of continuity, momentum, and energy as applied to fluid motion.
4. Recognize these principles written in form of mathematical equations.
5. Apply these equations to analyze problems by making good assumptions and learn systematic engineering method to solve practical fluid mechanics properties.

**UNIT-I**

**Introduction and Fluid Statics:** Dimensions and units- Physical Properties of Fluid, specific gravity, Viscosity, Surface Tension, Vapor Pressure, pressure at a point, Pascal's law, Hydrostatic Law, Atmospheric, Gauge and Vacuum pressure-measurement of pressure. Pressure gauges, Manometers: differential and micro Manometers. Hydro static forces on submerged plane, Horizontal, Vertical, Inclined and Curved surfaces-Centre of Pressure.

**UNIT-II**

**Fluid Kinematics:** Description of fluid flow, Stream line, Path Line and Streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows-Equation of continuity for one dimensional, two dimensional , three dimensional flows-stream and velocity potential functions, flow net analysis.

**UNIT-III**

**Fluid Dynamics:** Surface and body forces- Euler's and Bernoulli's Equation for flow along a stream line for 3-D flow, Momentum equation and it's application-forces on pipe bend, Pitot tube, Venturi - meter and Orifice meter-Classification of Orifices, flow over rectangular, triangular and trapezoidal and stepped notches-Broad crested weirs.

**UNIT-IV**

**Closed Conduct Flow:** Reynold's experiment-Characteristic 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**

**Boundry Layer Theory**:Approximate Solution of Navier Stoke's equation-Boundry layer –Concept, Prandtl contribution, characteristics of boundry layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent boundry layers (Introduction) Boundry Layer in transition, separation of Boundry Layer, Flow around submerged objects-Drag and Lift-Magnus effect.

**Text Books :**

1. PM Modi and SM Seth, " Fluid Mechanics ", Standard book house. Latest Edition.
2. F M White "Fluid Mechanics", Tata Mc Graw Hill Publishers.2011.

**Reference Books :**

1. Dr.R.K.Bansal "Fluid Mechanics and Hydraulic Machines",Laxmi Publications.
2. Dr.R.K. Rajput "Fluid Mechanics and Hydraulic Machines".
3. A.K.Mohanty "Fluid Mechanics ", Prentice hall of India Pvt Ltd.
4. J.F.Douglas, J.M.Gaserek and J.A.Swaffirld (Longman), "Fluid Mechanics".

**Outcomes :**

After completion of this course, students will be able to….

1. Apply fundamental knowledge of mathematics to modeling and analysis of fluid flow problems in civil and environmental engineering.
2. Apply fundamental mechanics kinematics and dynamics to fluid and its application.
3. Conduct Experiments (in teams) in pipe flows and open channel flows and documenting them in engineering reports.
4. Understand or become aware of disasters caused by an incorrect analysis in hydraulic Engineering system.
5. Apply fundamental principles of fluid mechanics for the solution of practical civil engineering problems of water conveyance in pipes, orifices, mouth pieces, notches and weirs.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J3105) SURVEYING AND GEOMATICS

**B.Tech II-Year I-Semester** **L T P C**
**3 0 0 3**

**Objectives :**

1. To know the basics of surveying and leveling & its application in civil engineering.
2. To know the Triangulation and trilateration process using theodolite.
3. To know setting out curves and its types and modern field survey instruments.
4. To know elements of Photogrammetry and aerial surveying.
5. To know basics of GIS and its application.

**UNIT-I**

**Introduction to Surveying:** Principles, Linear, angular and graphical methods, Survey stations, Survey lines-ranging, bearing of Survey lines.

**Levelling:** Plane table surveying, Principle of leveling- booking and reducing levels; differential, reciprocal levelling, profile leveling and cross sectioning. Digital and Auto level, errors in leveling; Contouring: Characteristics, Methods, Used: Computation of areas and Volumes.

**UNIT-II**

**Triangulation and Trilateration:** Theodolite Survey: Instruments, Measurement of Horizontal and vertical angle; Horizontal and vertical control- methods-triangulation-network-signals.Baseline-choices instruments and accessories-extension of base lines- corrections –satellite station-reduction to centre-intervisibility of height and distances-Trignometric leveling –Axis single Corrections.

**UNIT-III**

**Curves:** Elements of simple and Compound curves- methods of setting out-Elements of Reverse curve- Transition Curve – Length of curve –Elements of Transition curve- Vertical Curves.

**Modern Field Survey Systems:** Principle of electronic distance measurement, Modulation, Types of EDM instruments, Distomat, Total Station-Parts of a Total station-Accessories- Advantages and Applications, Field Procedure for total station Survey, error in Total Station Survey.

**UNIT-IV**

**Photogrammetry Surveying:** Introduction, Basic Concepts, perspective geometry of aerial photographs, relief and tilt displacements, terrestrial

Photogrammetry, flight planning, radial triangulation, methods; photographic mapping-mapping using paper prints, mapping using stereplotting instruments, mosaics, map substitutes.

**UNIT-V**

**Remote Sensing:** Introduction – Electromagnetic spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: Platforms and sensors; visual interpretation; digital image processing. Introduction to Geographic information systems.

**Text Books :**

1. Arora, K.R " Surveying Vol-I,II and III", Standard Book House, 2015.
2. Madhu N, Sathikumar R and Satheedh Gobi "Advanced Surveying : Total Satation,GIS and Remote Sensing" Pearson India.2006.

**Reference Books :**

1. Anji Reddy M " Remote Sensing and Geographical Information Systems" BS Publications 2001.
2. Chandra A.M, " Higher Surveying" Third Edition, New age International (P) Limited, 2002.
3. Bhavikatti S.S, " Surveying and Levelling, Vol-I and II" I.K.International, 2010.
4. Manoj , K Arora and Badjatia " Geomatics Engineering" Nem Chand & Bros, 2011.

**Outcomes :**

1. To understand the basics of surveying and leveling & its application in civil engineering.
2. To understand the Triangulation and trilateration process using theodolite.
3. To understand how to setting out curves and its types and modern field survey instruments.
4. To understand the elements of Photogrammetry and aerial surveying.
5. To understand the basics of GIS and its application.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J3106) SOLID MECHANICS LAB

**B.Tech II-Year I-Semester** **L T P C**

**0 0 3 1.5**

**Objectives :**

1. Study the uses of various types of testing machines and capacities.
2. Test various materials against various types of straining actions for assessing the strength of Materials.
3. Approximate analysis of tall structures subjected to horizontal loading .
4. Understand various implements to apply specific forces using the machine or to augment the utility of the same machine.

**List of Experiments :**

1. Tension test on mild steel & Tor steel.
2. Bending test on cantilever beam.
3. Bending test on simply supported beam.
4. Torsion test.
5. Rockwell hardness Test.
6. Brinells hardness test.
7. Spring Test.
8. Compression test on wood or Concrete.
9. Impact test.
10. Shear Test.

**Laboratory Manual :**

1. “Solid Mechanics Laboratory Manual , Prepared by the faculty of Civil Engineering Department.

**Outcomes :**

1. Clearly understand the concept of deciding the shape or type of specimen for assessing different strengths against various straining actions.
2. Design the specimen for assessing a property of the material with the available machines.
3. Understand the procedure for making use of various techniques of load measuring or deformation measuring instruments.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J3107) SURVEYING LAB - I

**B.Tech II-Year I-Semester**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Objectives :**

1: Learn and understand the various basic concept and principles used in surveying like Chain Surveying, Compass surveying, Plane Table Surveying and Leveling.

2: Learn and understand various instruments used in surveying.

3: Learn and understand how to calculate area of plot and ground.

4: Learn and understand about Horizontal angle, Vertical Angle, Horizontal distance and vertical distance to study the ground profile.

**List of Exercises:**

1. Survey of an area by chain survey (closed traverse) & plotting.
2. Chaining across obstacles.
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection method by plane table survey.
6. Two point and three point problems in plane table survey.
7. Traversing by plane table survey.
8. Fly leveling (differential leveling).
9. An exercise of L.S and C.S and plotting of road works.
10. Two exercises on contouring.

**Outcomes :**

1: Prepare map and plan for required site with suitable scale.

2: Prepare contour map and estimate the quantity of earthwork required for formation level for road and railway alignment.

3: Judge which type of instrument to be used for carrying out survey for a particular area and estimate the area.

4: Judge the profile of ground by observing the available existing map.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (JMC01) ENVIRONMENTAL STUDIES

**B.Tech II-Year I-Semester** **L T P C**
**2 0 0 0**

**Objectives :**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations.

**UNIT –I**

**Human Environment and Ecosystem:** Introduction, Types of Environment (Natural Environment and its components). Man Made Environment, Social Environment, Concern about the environment, Potential hazards of carelessness in development activities (Bhopal tragedy, Chernobyl Accident).

**Eco System:** Definition, Types, structure, functional components of ecosystem, food chain and food web, flow of energy in an ecosystem, ecological pyramids, Bio magnification, Bio geochemical cycles (Gaseous and sedimentary cycles), ecosystem services and values.

**UNIT –II**

**Natural Resources:** Classification of resources, Living and Non living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**UNIT –III**

**Biodiversity and Biotic Resources:** Introduction, genetic, species and ecosystem diversity, value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values, India as a mega diversity nation, Hot spots of biodiversity, threats to biodiversity; habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-situ and Ex-situ conservation.

**UNIT –IV**

**Environmental Pollution and Control Technologies:**
**Environmental Pollution:** Classification of Pollution
**Air Pollution:** Primary and Secondary pollutants, air pollution problems, Ambient Air Quality Standards.

**Water Pollution:** Source and types of pollution, problems due to water pollution, drinking water quality standards.

**Soil Pollution:** Source and types, Impacts of modern agriculture, degradation of soil.

**Noise Pollution:** Sources and health hazards, standards.

**Solid Waste:** Municipal solid waste management, composition and characteristics of E-waste and its management.

**Pollution Control Technologies:** Wastewater treatments methods: Primary, secondary, tertiary.

**UNIT –V**

**Global Environmental Problems and Global Efforts:** Climate change and impact on human environment. Ozone depletion and Ozone depleting substance (ODS). Acid rains, Deforestation and desertification.

**International Conventions/Protocols:** Earth Summit, Kyoto protocol and Montreal Protocol.

**Text Books :**

1. Text book of Environmental Studies for undergraduates courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R.Rajagopalan, Oxford University Press.

**Reference:**

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and Science by Gilbert M. Masters and Wendell P. Ela 2008 PHI Learning Pvt.Ltd.
3. Environmental Science by Daniel B. Botkin and Edward A.Keller, Wiley India Edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New Age International Publishers.
5. Text Book of Environmental Science and Technology- Dr.M.Anji Reddy 2007 BS Publication.

**Outcomes:** After undergoing the course the student would be able to know about

1. Understanding of Ecosystem.
2. Natural resources, Depletion of natural resources and prevention methods.
3. Biodiversity, Protection, sharing of the biodiversity.
4. Environmental pollution- Understanding of water, soil, noise and air pollution and their control measures.
5. Students can understand about global environmental problems and they are aware of global efforts.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J4108) ENGINEERING HYDRLOGY

**B.Tech II-Year II-Semester- CIVIL** **L T P C**

**3 0 0 3**

**Objectives :**

1. To know the Hydrologic cycle and analysis of rainfall data.
2. To understand Evaporation, Infiltration and runoff.
3. To learn Characteristics of Hydrograph and Ground water hydraulics.
4. To know the Principles of flood routing in reservoirs.
5. To understand Aquifers and its types and uses.

**UNIT – I**

**Elements of Hydrology:** Definition, Hydrologic cycle, Water budgeting, Water potential in India.

**Precipitation and its Measurement:** Types of Precipitation, Recording & Non-recording type of rain gauges-errors in measurement - Location of rain gauges. Analysis of rain falls data by mass curves, Hyetograph, Intensity duration analysis, Estimation of missing precipitation data, Consistency test of data by double mass curve technique, Probable maximum precipitation.

**UNIT – II**

**Evaporation and Evapotranspiration:** Factors affecting the processes and their estimation, Pan evaporation, Blaney Criddle, Hargreaves, Penmann and Lysimeter methods, Methods of reducing evaporation from reservoirs.

**Infiltration and Runoff:** Factors affecting infiltration, measurements of infiltration, infiltration indices, Factors affecting runoff, Estimation of runoff from rainfall, Flow duration curve and mass curve and their uses.

**UNIT – III**

**Hydrograph analysis:** Characteristics of hydrograph, separation of base flow, Unit hydrograph, S-Curve hydrograph, Synthetic unit hydrograph, and Dimensionless unit hydrograph.

**UNIT – IV**

**Floods:** Rating curve and its extension, reservoir routing, Establishing Storage-Discharge relationship, I.S.D method, channel routing-Muskingum Method, determination of Muskingum parameters k and x.

**Design Flood:** Methods of estimation of design flood empirical formulae, rational method, Frequency analysis, Gumble's distribution and unit Hydrograph method.

**UNIT – V**

**Aquifers:** Ground water occurrences, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers, Well hydraulics types of wells-well construction-well development.

**Text Books :**

1. K. Subramanya, "Engineering Hydrology", Tata Mc Graw Hill Book Co., New Delhi.
2. P. Jayarami Reddy, "A Textbook of Hydrology", Laxmi Publishers, New Delhi.

**References :**

1. R.K. Linsley, M.A. Kohler & J.L.Paulus, "Hydrology for Engineers", Mc Graw Hill Book Co,New Delhi.
2. R.S. Varshney, "Engineering Hydrology", Nemchand Bros., Roorkee.
3. H.M. Raghunath, "Hydrology", New Age International Pulishers, New Delhi.

**Outcomes :**

On completion of this course, students will be able to

1. Describe Hydrologic cycle and Analyze rainfall data.
2. Estimate Evaporation, Infiltration & runoff.
3. Examine Characteristics of hydrograph & Compute ground water hydraulics.
4. Apply Principles flood routing in reservoirs.
5. Describe Aquifers, their parameters and uses.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J4005) PROBABILITY AND STATISTICS

**B.Tech II-Year II-Semester- CIVIL** **L T P C**

**3 1 0 4**

**Pre-requisites:** Mathematical Knowledge at pre-university level

**Objectives:** The Students able to learn

1. The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
2. The basic ideas of statistics including measures of central tendency, correlation and regression.
3. The statistical methods of studying data samples.

**UNIT – I**

**Basic Probability:** Probability spaces, conditional probability, independent events, and Bayes' theorem.Random variables: Discrete and continuous random variables, Expectation of Random Variables, Moments, Variance of random variables, Chebyshev's Inequality.

**UNIT – II**

**Discrete Probability distributions:** Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution.

**UNIT – III**

**Continuous Random variable & Distributions:** Continuous random variables and their properties, distribution functions and densities, Normal, exponential and gamma distributions, evaluation of statistical parameters for these distributions.

**UNIT – IV**

**Applied Statistics:** Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves; Correlation and regression – Rank correlation.

**UNIT – V**

**Testing of Hypothesis:** Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means; Test for single mean, difference of means for small samples, test for ratio of variances for small samples.

**Text Books :**

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9thEdition, Pearson Publications.
2. Fundamentals of Mathematical Statistics, Khanna Publications, S C Guptha and V.K. Kapoor.

**References :**

1. Miller and Freund's, Probability and Statistics for Engineers, 8thEdition, Pearson Educations.
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

**Outcomes:** After learning the contents of this paper the student must be able to

1. Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J4109) CONCRETE TECHNOLOGY

**B.Tech II-Year II-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
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**Objectives :**

1: Use different types of cement as per their properties for different field applications.

2: Learn the methods of testing of aggregates.

3: Design economic concrete mix proportion for different exposure conditions and intended. Purposes & supervise various concreting operations.

4: Learn the properties and tests on hardened concrete.

5: Learn about Mix Design and Special Concrete properties and their applications.

**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 – relevant IS codal provisions.

**UNIT - II**

**Aggregates:** 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 – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size– relevant IS codal provisions.

**UNIT- III**

**Fresh Concrete:** Workability significance – 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– relevant IS codal provisions.

**Curing** –significance – types of curning.

**UNIT - IV**

**Hardened Concrete :** Water / Cement ratio – Abram's Law – Gel space ratio – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - relevant IS codal provisions.

**Testing of Hardened Concrete:** Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions.

**Elasticity, Creep & Shrinkage** – Modulus of elasticity – Dynamic modulus of elasticity – Posisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage– relevant IS codal provisions.

**Durability** - Factors effecting – Carbonation – Sulphate attack – Chloride attack- Alkali aggregate reaction.

**UNIT - V**

**Mix Design:** Factors Affecting in the choice of mix proportions– Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design– relevant IS codal provisions.

**Special Concretes:** Introduction to light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fiber reinforced concrete – Polymer concrete – High performance concrete – Self compacting concrete– relevant IS codal provisions.

**Text books :**

1. A.M.Neville "Properties of Concrete" Low priced Edition – 4th edition.
2. M.S.Shetty "Properties of Concrete" S.Chand & Co. 2004.
3. Relevant IS codes.

**References :**

1. M.L. Gambhir, "Concrete Technology" – Tata Mc. Graw Hill Publishers, New Delhi.
2. A.R. Santha Kumar, "Concrete Technology" Oxford university Press, New Delhi.
3. P.K.Mehta and J.M.Monteiro, "Concrete: Micro structure, Properties and Materials" McGrawHill Publishers.

**Outcomes:**

1. Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests.
2. Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.
3. Develop an advanced knowledge of the mechanical performance of cement based materials and how it can be controlled.
4. Use various chemical admixtures and mineral additives to design cement based materials with tailor-made properties.
5. Understand the mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, fibre reinforced concrete, etc.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J4110) HYDRAULICS AND HYDRAULIC MACHINERY

**B.Tech II-Year II-Semester- CIVIL**

| L | T | P | C |
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**Objectives :**

1: Apply fundamental principles of fluid mechanics for the solution of practical Civil Engineering problems of water conveyance in open channels.

2: Study, Analyze and Design of channels in uniform and Non-uniform flow conditions.

3: Describe the basics operating characteristic of turbo machinery.

4: Describe the operating characteristics of hydraulic machinery (pumps and turbines) and The factors affecting their operation and specifications, as well as their operation in a system.

5: Study and Analyze different types and elements of Hydro Electric Power Plants.

**UNIT – I**

**Open Channel Flow:** Types of flows-Types of channels-Velocity distribution-Energy and momentum correction factors-Chezy's Manning's and Bazin formulae for uniform flow- Most Economical sections. Critical flow: Specific energy-critical depth-computation of critical depth-critical sub-critical and super critical flows. Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, Horizontal and adverse slopes-surface profiles-direct step method-Rapidly varied flow, hydraulic jump, energy dissipation.

**UNIT – II**

**Hydraulic Simlitude:** Dimensional analysis-Rayleigh's method and Buckingham's ð-theorem-study of Hydraulic models-Geometric, Kinematic and dynamic similarities-dimensionless numbers-model and prototype relations. Distorted and non distorted models.

**UNIT – III**

**Basics Of Turbo Machinery:** 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, expression for work done and efficiency-angular momentum principles, Applications to radial flow turbines.

**UNIIT – IV**

**Hydraulic Turbines:** Classification of Turbines - Heads and efficiencies of Turbines-Pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft

tube-theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

**UNIT – V**

**Centrifugal Pump:** Installation details-classification-types work done-Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel-performance of pumps-characteristic curves-NPSH-cavitation. Classification of Hydropower plants- Definition of terms-load factor, utilization factor, capacity factor, estimation of hydropower potential. Layout of a typical hydropower plant installation.

**Text Books :**

1. K.Subramanya, " Open Channel flow", Tata Mc Graw Hill Publishers.
2. Modi &Seth "Fluid Mechanics& Hydraulic Machines", Standard book house.

**Reference Books :**

1. D.S.Kumar "Fluid Mechnanics & Fluid power Engineering ", Kataria & Sons Book Co.
2. Banga & Sharma "Hydraulic Machines", Khanna Publications.
3. Ranga Raju "Elements of open channel flow", Tata Mc Graw Hill Publishers.
4. V.T.Chow, "Open Channel Flow", Tata Mc Graw Hill book company.

**Outcomes :**

After completion of this course, students will be able to

1: Apply fundamental knowledge of fluid mechanics in solving problems and making Design of open channel hydraulics in civil and environmental engineering.

2: Describe and apply dimensional analysis and similarity to develop hydraulic models and testing.

3: Understand the basics of turbo machinery.

4: Understand the basics of hydraulic machinery and their operation design in water Distribution systems.

5: Select and design appropriate pumps, classification, identify and design of hydraulic Turbines and their application in Hydro Electric Power Plants.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J4129) ENERGY SCIENCES AND ENGINEERING
**(Professional Elective - I)**

**B.Tech II-Year II-Semester - CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1. Introduction to energy systems.
2. Sources of energy and types.
3. Energy conservation and methods.
4. Civil projects and energy sources.
5. Engineering application of energy conservation.

**UNIT-I**

**Introduction to Energy Science:** Scientific principle and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, Sustainability & the environment.

**UNIT-II**

**Energy Sources:** Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (Coal, Oil, Oil-bearing shale and sands, Coal gasification)-Past, Present & Future Remedies & alternatives for fossil fuels-bio mass, Wind, Solar, Nuclear, Wave, Tidal and hydrogen; Sustainability and environment trade-offs of different energy systems; possibilities for energy storage or regeneration. (Ex: Pumped hydro power projects, superconductors-based energy storages, high efficiency batteries).

**UNIT-III**

**Energy and Environment:** Energy Efficiency and Conservation; Introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; Introduction to the economics of energy; How the economic systems determines production and consumption; linkage between economic and environmental outcomes; How future energy use can be influenced by economic, environmental trade and research policy.

**UNIT-IV**

**Civil Engineering Projects connected with the Energy Sources:** Coal Mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installation

for tidal power, wind mill towers; hydro power stations above ground and underground along with associated dams, tunnels, penstocks etc; Nuclear reactor containment buildings and associated buildings, design and construction and testing procedures for reactor containment buildings; spent nuclear fuel storage and disposal systems.

**UNIT-V**

**Engineering for Energy Conservations:** Concept of Green Building and Green Architecture; Green building Concepts (Green building encompasses everything from the choice of building materials to where a building is located, how it is designed and operated); LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as a candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy audit of facilities and optimization of energy consumption.

**Text Books :**

1. Boyle, Godfrey, " Renewable Energy", Oxford University Press.
2. Culp, A.W., "Principles of Energy Conversion", McGraw Hill New York, 2004.
3. Jose Goldeberg. Thomas Johanson, and Reddy A.K.N., "Energy for Sustainable World", Wiley Eastern, 2005.

**References :**

1. Charles E. Brown, "World Energy Resources", Springer Publication, New York, 2002.
2. Related Papers published in International Journals.

**Outcomes :**

On completion of this course, students will be able to

1. Know the energy systems.
2. Know Sources of energy and types.
3. Understand Energy conservation and methods.
4. Know Civil projects and energy sources.
5. Understand Engineering application of energy conservation.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J4130) SOLID MECHANICS – II
**(Professional Elective – I)**

**B.Tech II-Year II-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1: Behavior of bodies subjected to various types of Compound stresses and the associated strains.

2: Various methods to evaluate slope and deflection.

3: Stresses developed in short and long columns and chimneys.

4: Analysis of statically indeterminate structures.

5: To know the thick and thin cylinders and their behavior.

**UNIT – I**

**Compound Stresses and Strains:** Two Dimensional systems, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, ellipse of stress and their applications. Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain.

**UNIT – II**

**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-condition of stability-stresses due to direct loading and bending moment about both axis.

**Theories of Failure:** Introduction**-**Various theories of failure**-** Maximum principal stress theory, Maximum principal strain theory, Maximum shear stress theory, Strain energy theory and Shear strain energy theory (Von Mises Theory).

**UNIT – III**

**Fixed and Continuous Beams:** Analysis of fixed beams for shear and bending moments, Deflection of fixed beams, Effect of sinking of supports, Analysis of continuous beams using clapeyron's theorem of three moments, Effect of sinking of supports.

**Statically Indeterminate Frames:** Analysis of statically indeterminate frames up to two degree of indeterminacy using Castigliano's theorem.

**UNIT – IV**

**Unsymetrical Bending:** Introduction-centroidal principle 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 axes-Resolution of bending moment into two rectangular axes through the centroid-Location of neutral axis-Deflection of beams in Unsymmetrical bending.

**UNIT – V**

**Thin Cylinders:** The seamless cylindrical shells-Derivation and 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-Thick spherical shells.

**Text Books :**

1. Timoshenko and Gere, "Mechanics of Materials", PWS Publishing Company, Boston, 4th edn., 1997.
2. H.J.Shah and S.B. Junnarkar, "Mechanics of Structures Vol.-I. and Vol.-II", Charotar Publishing House Pvt. Ltd., Anand, 31st edn., 2014.

**Reference Books :**

1. Andrew Pytel and Ferdinand L. Singer, "Strength of Materials", Harper and Row Publishers, New York, 4th edn., 2011.
2. Ferdinand P Beer et al., "Mechanics of Materials", Tata McGraw Hill Education Pvt. Ltd.

**Outcomes :**

After completion of this course, students will be able to….

1: Explicate the Compound stress and strains.

2: Analyze slope and deflection in beams subjected to loading.

3: Evaluate the stresses in long and short columns with various loading and boundary conditions.

4: Apply principles of Clapeyron's and Castigliano theorem in analyzing indeterminate structures.

5: Explore the behavior of thick and thin cylinder and their properties.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J4131) AIR & NOISE POLLUTION AND CONTROL
**(Professional Elective – I)**

**B.Tech II-Year II-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

1. To Know about Air pollution.
2. To learn control of Particulates in air.
3. To learn control of gaseous emission in air.
4. To know about air quality a management.
5. To know noise pollution and its control.

**UNIT-I**

**Air Pollution:** Definition, scope, significance and episodes, air pollutants-classification-Natural and Artificial-Primary and Secondary air pollutants, Point, Line and areal sources of air pollution- Stationary and mobile sources, Effect of air pollutants on man, material and vegetation: Global effects of air pollution-Green house effect, Heat Islands, Acid Rains, Ozone hole etc.

**UNIT-II**

**Control of Particulates:** Control of particulates at sources, Process changes, Equipment modifications, Design and operation of Control; Equipments: Setting Chambers, Cyclone sepraters, filters, Dry and wet scrubbers, Electro static precipitators.

**UNIT-III**

**Control of Gaseous Emission:** General methods of control of NOx and Sox emissions- In plant control measures, process changes, dry and wet methods of removal and recycling-Adsorption-Absorption-Combustion.

**UNIT-IV**

**Air Quality Management:** Monitoring of SPM, SOx; NOx and CO emission standards- Air sampling , Sampling Techniques-High Volume air sampler-Stack sampling-Analysis of air Pollutants - Air Quality standards-Air Pollution Control Act.

**UNIT- V**

**Noise Pollution:** Basics of acoustics and specification of sound; Sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psychoacoustics and noise criteria, effects of noise on health, annoyance rating scheme; Special noise environments: Infrasound, ultrasound, Impulsive sound and sonic boom;

noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices. Noise control methods.

**Text Books :**

1. Rao.M.N and Rao H.V.N, “Air Pollution” – Tata McGrawhill Company.
2. Aggarwal S.K, “Noise Pollution and Control” APH Publication – 2005.

**References :**

1. Trivedy R.K. and Goel P.K., “ An Introduction to Air Pollution” B.S Publications.
2. Wark and Warner, “Air Pollution”- Harper & Row. NewYork.

**Outcomes :**

After completion of this course, students will be able to

1. Differentiate the types air pollution.
2. Know Control of Particulates in air and its procedures.
3. Know Control of gaseous emission in air and its procedures.
4. Know air quality management and its application.
5. Know about Noise pollution and its control methods.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J4111) CONCRETE TECHNOLOGY LAB

**B.Tech II-Year II-Semester - CIVIL** **L T P C**
**0 0 2 1**

**Objectives :**

This laboratory course will develop students' knowledge in/on

1: Testing of cement.

2: Testing of fine aggregates and coarse aggregates.

3: Testing of fresh and hardened concrete.

4: Non-destructive testing of concrete.

**List of Experiments :**

1. Fineness of Cement.
2. Specific Gravity of Cement.
3. Soundness of Cement.
4. Standard Consistency of Cement.
5. Initial and Final Setting Times of Cement.
6. Compressive Strength of Cement.
7. Fineness Modulus of Fine and Coarse Aggregates.
8. Bulk Density, Specific Gravity, Porosity and Void Ratio of Fine Aggregate and Coarse Aggregate.
9. Bulking of Fine Aggregate.
10. Workability of Fresh Concrete.
11. Tests on Hardened Concrete.

a) Compressive Strength, b) Split Tensile Strength, c) Modulus of rupture.

12. Young's Modulus of Concrete.
13. Demonstrate Non- Destructive Testing of Concrete (Rebound Hammer Test)

**Laboratory Manual:**

1. "Concrete Technology Laboratory Manual", prepared by faculty of Department of Civil Engineering.
2. Relevent IS Codes.

**Text Books :**

1. M.L. Gambhir, "Concrete Technology", Tata McGraw-Hill, New Delhi, 5th edn.

2. M.S. Shetty, “Concrete Technology (Theory and Practice)”, S. Chand Company, New Delhi, 7th edn.
3. A.R. Santhakumar, “Concrete Technology”, Oxford Publishers, 1st edn.
4. A.M. Neville, “Properties of Concrete”, Mc Graw Hill Publications, New Delhi, 5th edn.

**Outcomes :**

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

1: Interpret laboratory testing results of cement for construction.
2: Interpret laboratory testing results of fine aggregate and coarse aggregate for construction.
3: Interpret laboratory testing results of fresh and hardened concrete for construction.
4: Demonstrate various methods of non-destructive testing of concrete.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J4112) SURVEYING LAB - II

**B.Tech II-Year II-Semester - CIVIL**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Objectives :**

1: Learn and understand the use of theodolite for different angles and method.

2: Learn and understand the use of Levelling instrument for different problems.

3: Learn and understand the setting out works and curves using theodolite and leveling instrument.

4: Learn and understand the using of Total Station.

**List of Exercises :**

1. Study of theodolite in detail-practice for measurement of horizontal and vertical angles.
2. Measurements of horizontal angles by method of repetition and reiteration.
3. Trigonometric Leveling-Heights and distance problems (Two Exercises).
4. Height and distance using Principles of tachometric surveying (Two Exercises).
5. Curve Setting-different methods (two Exercises).
6. Setting out works for buildings & pipe lines.
7. Determination of area using total station.
8. Contouring using total station.
9. Determination of remote height using total station.
10. State-Out using total station.
11. Distance, gradient, Diff, height between two inaccessible points using total stations.

**Laboratory Manual :**

1. “Surveying –II Laboratory Manual”, prepared by faculty of Department of Civil Engineering.

**Outcomes :**

1: Explore to carrying out survey using theodolite for different methods.

2: Explore to carrying out leveling using leveling instrument for different methods.

3: Explore to learn the setting out works and curve setting.

4: Explore to learn advance method of surveying using total station.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J4113) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

**B.Tech II-Year II-Semester - CIVIL**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Objectives :**

1: Compare the result of analytical models introduced in lecture to the actual behavior of real fluid flow.

2: Discuss and practice standard measurement techniques of fluid mechanics and their applications.

3: Familiarize the students with the componenets and working principles of the Hydraulic machines-different types of turbines, Pumps, amd other miscellaneous hydraulics machines.

4: Learn and practice writing technical reports and to work on small design projects.

**List of Experiments :**

1. Determination of Coefficient of discharge for Venturi meter & 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 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 Francis Turbine.
11. Performance test on Kaplan Turbine.
12. Performance characteristic of a single stage/multi stage centrifugal pump.
13. Performance characteristic of a reciprocating pump.

**Laboratory Manual :**

1. "Fluid Mechanics & Hydraulic Machinery Manual", prepared by faculty of Department of Civil Engineering.

**Outcomes :**

1: Utilize basic measurement techniques of fluid mechanics and able to differentiate among measurement techniques their relevance and applications.

2: Demonstrate Practical understanding of minor and friction losses in pipe flows.

3: Demonstrate practical working of hydraulic machines-different types of Turbines, Pumps, and other miscellaneous hydraulics machines.

4: Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (JMC02) GENDER SENSITIZATION

**B.Tech II-Year II-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 0 |

**Objectives :**

1. To develop students' sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

**UNIT – I**

**Understanding Gender:** Gender: Why Should We Study It? (Towards a World of Equals: Unit -1) Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

**UNIT – II**

**Gender and Biology Missing Women:** Sex Selection and Its Consequences (Towards a World of Equals: Unit-4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10) Two or Many? Struggles with Discrimination.

**UNIT – III**

**Gender and Labour Housework:** The Invisible Labour (Towards a World of Equals: Unit -3) "My Mother doesn't Work." "Share the Load." Women's Work: Its Politics and Economics (Towards a World of Equals: Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

**UNIT – IV**

**Issues of Violence Sexual Harassment:** Say No! (Towards a World of Equals: Unit -6) Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu". Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8) Is Home a Safe Place? -When Women Unite [Film]. Rebuilding lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (Towards a World of Equals: Unit -11) Blaming the Victim-"I Fought for my Life.." – Additional Reading: The Caste Face of Violence.

**UNIT – V**

**Gender : Co – Existence Just Relationships:** Being Together as Equals (Towards a World of Equals: Unit -12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

**Text Book** :

All the five Units in the Textbook, "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.

**Note**: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

**Reference :**

1. 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:

**Outcomes :**

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J5114) STRUCTURAL ANALYSIS - I

**B.Tech III-Year I-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1: Distribution of forces at joints.

2: Analysis of indeterminate trusses.

3: Approximate analysis of tall structures subjected to horizontal loading.

4: The variation of internal forces in a structural member for moving loads.

5: Influence line diagram.

**UNIT – I**

**Energy Theorem:** Introduction, strain energy in linear Elastic system, expression of strain energy due to axial load, Castiglione's first theorem-unit load method. Deflections of simple beams and pin-jointed plane trusses. Deflections of statically determinate frames.

**Indeterminate Trusses:** Determination of Static and kinematic indeterminacies, Analysis of trusses having single and two degrees of internal and external indeterminacies- Castigliano's second theorem.

**UNIT – II**

**Slope Deflection Method:** Development of SD Equation, sign convention, construction of bending moment diagrams Claperyron's theorem of three moments, analysis of continuous beams, rectangular portal frame, effect of yielding and sinking of support, frame with side Sway, and principle of symmetry.

**UNIIT – III**

**Moment Distribution Method:** Introduction, Distribution and carryover factor, Application to continuous beams, sinking and yielding of support, portal frame, frame with side Sway, principle of symmetry .Analysis of inclined frames.

**UNIT – IV**

**Moving Loads:** Maximum BM and SF diagrams for simple beams traversed by single point load, a pair of point loads, uniformly distributed load shorter and longer than the span, system of point loads, Absolute maximum bending moment and absolute maximum shear force enveloping parabola and equivalent UDL.

**UNIT – V**

**Influence Line Diagrams:** Influence line diagram for support reaction, bending moment and shear force for simple and over hanging beams, for girders with cross beams, ILD for stresses in members for warren girder and Pratt truss

with sloping shed, for deck and trough type bridges, focal length and counter bracing.

**Text Books :**

1. C.S.Reddy, “Basic Structural Analysis”, Tata Mc Graw Hill Education Pvt. Ltd., New Delhi.
2. Pandit and Gupta, “Structural Analysis vol-1 and vol 2”, Tata Mc Graw Hill Publishers.

**Reference Books :**

1. C.K. Wang “Indeterminate Structural Analysis”, McGraw Hill Book Co.
2. B.C. Punmia, A.K.Jain and A.K.jain “Theory of Structures”, Laxmi Publications, New Delhi.
3. Vazrani and Ratwani, “ Structural Analysis vol-1 and vol 2”, Khanna Publishers.
4. S. Ramamrutham and R. Narayan “Theory of Structures”, Dhanpat Rai.

**Outcomes :**

After completion of this course, students will be able to….

1: The distribution of forces at joints and also developing net bending moment and shear force diagrams for indeterminate structures.

2: Analyze the indeterminate trusses.

3: Analyze the tall structures using approximate analysis for horizontal loads.

4: Draw the variation of internal forces in structural members for moving loads.

5: Draw line diagram for the Support reaction, beams and girders.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J5115) DESIGN OF REINFORCED CONCRETE STRUCTURES

**B.Tech III-Year I-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**Objectives :**

This course will develop students' knowledge in/on

1: Concepts of limit state method of design.

2: Design of reinforced concrete beams for collapse in serviceability limit state.

3: Design of slabs and columns using limit state design.

4: Design of footings, stair cases and.

5: Concept of working stress method.

**UNIT – I**

**Fundamentals of Limit State Design:** Introduction to reinforced cement concrete, Loads on structures, Methods of design, Code of practice, Stress-strain curves of concrete, Mild steel and Tor steel, Grades of concrete as per IS: 456-2000, Characteristic loads and strengths , Partial safety factors.

**Limit State of Collapse in Flexure**: Analysis and design of Beams, Singly, doubly reinforced rectangular and flanged sections.

**UNIT – II**

**Shear and Torsion**: Shear, torsion, bond and development length.

**Limit State of Serviceability:** Check for short term deflection for determinate beams, Long term deflection due to creep, Long term deflection due to differential shrinkage.

**UNIT – III**

**Slabs**: Design of one way simply supported and continuous slabs and two way slabs as per IS: 456-2000.

**Columns**: Axially loaded rectangular columns, circular columns with lateral ties and helical reinforcement, axially loaded short columns with uni-axial bending moment.

**UNIT – IV**

**Footings**: Design of isolated footing for axially loaded columns, Design of combined footing.

**Design of dog legged staircase**: Introduction, Types of staircases, Loads on stair case slabs, Design of dog legged staircase.

**UNIT – V**

**Working Stress Method of Design:** Design Principles, under reinforced, balanced and over-reinforced beams, Analysis and design of rectangular beams, Design for shear.

**Text Books :**

1. A.K. Jain, “Limit State Design”, Nem Chand Brothers, Roorkee.
2. S. Unnikrishna Pillai and Devdas Menon, “Reinforced Concrete Design”, Tata Mc.Graw-Hill Publishing Company Limited, New Delhi.
3 N.Subramanyam “ Reinforced Cocrete Structures” Oxford Higher Education Press.

**Reference Books :**

1. Jai Krishna and O.P. Jain, “Plain and Reinforced Concrete”, Nem Chand Brothers, Roorkee.
2. B.C. Punmia, “Reinforced Concrete Structures”, Laxmi Publishing Company, New Delhi.
3. IS 456, “Code of practice for Plain and reinforced concrete”, Bureau of Indian standards, New Delhi, 2000.
4. IS 875 (part 1-5), “Code of practice for Design loads”, Bureau of Indian standards, New Delhi, 1987.

**Outcomes :**

After completion of this course, students will be able to….

1: Explain the general mechanical behavior of reinforced concrete.
2: Analyze and design reinforced concrete flexural members.
3: Design one way, two way slabs and columns.
4: Design footings and staircase.
5: Summarize working stress method.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J5116) HIGHWAY ENGINEERING

**B.Tech III-Year I-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

1. To know Planning and different types of roads.
2. To study Geometric design of highways.
3. To study the traffic characteristic and parking facilities.
4. To understand Highway materials their desirable properties and suitability.
5. To learn Design of flexible, rigid pavements and also the construction.

**UNIT – I**

**Highway Development and Planning:** Classification of roads, road development in India, Current road projects in India; Highway Alignment and Project Preparation.

**UNIT – II**

**Geometric Design of Highways:** Introduction; Highway cross section elements; Sight distance, design of horizontal alignment; design of vertical alignment; design of intersections; problems.

**UNIT – III**

**Traffic Engineering and Control:** Traffic Characteristics, traffic engineering studies, traffic flow and capacity, traffic regulation and control; design of road intersection; design of parking facilities; highway lighting; problems.

**UNIT – IV**

**Pavement Materials:** Materials used in highway construction - Soils, stone, aggregates, bituminous binders, bituminous paving mixes; Portland cement and cement concrete: desirable properties, tests, requirements for different types of pavements; Problems.

**UNIT – V**

**Design of Pavements:** Introduction; flexible pavements, factors affecting design and performance; stresses in flexible pavements; design of flexible pavements as per IRC; Rigid Pavements-components and functions; factors affecting design and performance of CC pavements; stresses in rigid pavements; design of concrete pavements as per IRC;

**Text Books:**

1. S.K. Khanna, C.E.G. Justo, A.Veeraraghavan,"Highway Engineering", Nem Chand and Bros.
2. Partha Chakraborty, "Principles of Transportation Engineering", PHI Learning.

**Reference Books :**

1. E.J. Yoder and Witezak, "Principles of Pavement Design", John Wiley and Sons, 2nd edn.,
2. L.R.Kadiyali, "Principles of Highway Engineering", Khanna Publishers.
3. Relevant IRC Codes IRC: 37, IRC: 38, IRC: 52, IRC: 58, IRC: 66, IRC: 73, IRC 81, IRC: 86 and MORTH.

**Outcomes :**

On completion of this course, students will be able to

1. Know about types of roads and their development from time to time and current projects.
2. Analyze the planning process required for highways and design the geometric features.
3. Analyze the traffic characteristic, parking facilities and their solutions using intersections.
4. Evaluate and Recommend suitable highway materials.
5. Design of flexible, rigid pavement.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J5132) BUILDING MATERIALS, CONSTRUCTION AND PLANNING
**(Professional Elective –II)**

**B.Tech III-Year I-Semester- CIVIL** **L T P C**

**3 0 0 3**

**Objectives :**

1: To Know Occurrence and existence of stone and preparation of brick.

2: To learn Classification of timber, properties of other building Materials.

3: To Know different building components.

4: To Know Functional requirements of building and services needed in building.

5: To know the Construction of masonry work, adopting suitable temporary supporting system.

**UNIT-I**

**Introduction**: Identification of materials for Construction in Civil Engineering Practice, Physical and Mechanical properties of building Materials.

**Stones**: Classification of Stones, Properties of Stones, Characteristic of good building Stone, Tests on Stones.

**Bricks**: Composition of good brick, Manufacturing process of bricks, Characteristic of good building bricks, Classification of bricks, Tests on Bricks.

**UNIT-II**

**Cement:** Raw materials, manufacturing process, types of cement, hydration of cement, properties of cement, IS-Recommendation.

**Concrete:** Manufacturing process of cement concrete, grade designation, workability, segregation, bleeding.

**Timber:** Classification of trees, Seasoning of Timbers, Preservation of Timber, Industrial Timber, Defects in Timber.

**Miscellanious**: GI/Fiber reinforced glass brick, Glass, Plastics, Asbestos, and Thermo coal, Flyash, Paints, Construction Steel and Tiles.

**UNIT-III**

**Walls**: Types of Walls, Thickness of Walls, Cavity Wall.

**Opening In Buildings**: Doors and Windows, Types, Sizes and suitable for different location, Ventilators, lintels, Arches.

**Vertical Transportation**: Types of Vertical Transportation in building, Staircase, Type of Staircases, Design of Staircase.

**Roofs**: Flat roof, brief description of RCC roof, madras terrace and Jack arch roof, method of construction.

**UNIT-IV**

**Building Planning**: Functional Planning of Buildings-Components of Buildings-IS/NBC Recommendations.

**Building Services**: Plumbing Services, Water distribution ,Sanitary lines and Fittings, Electricals services, Functional Requirements, System of Ventilations, Air-conditioned-Essential and Types, Acoustics, Characteristic absorption, Acoustic Design and Sound Installation. Fire Protection, Fire Hazardous, Classification of Fire resistant materials and Constructions, Fire Protection Measures.

**UNIT-V**

**Masonry Work**: Stone Masonry, Dressing of Stones-Specification of stone masonary, Brick Masonry, Bond in Brick Masonry-Specification of Brick Masonry. RCC Brick –Specification of RCC Bricks and fly ash based bricks.

**Temporary Supporting Structure**: Brief Description of Centring, Formwork, Scaffolding, Types of Scaffolding, Standard of Scaffolding, Shoring, and Underpinning.

**Finishing Work:** Brief Description of Plastering, Pointing, White and Colour washing, Types of Wall Covering, False CEILING Work, Cladding, and Types of Tiles.

**Text Books :**

1. S.P Arora and Bindra, “A Textbook of Building Construction”, Dhanpat Rai and Sons, 4th Edn., 2010.
2. Dr. B.C. Punmia, “Building construction”, Laxmi Publications Pvt., Ltd, New Delhi, 19th Edn., 2005.
3. S.K. Duggal, “Building materials”, New Age international Pvt. Ltd., New Delhi.

**Reference Books :**

1. Relavent IS codes.
2. S.V. Deodhar, “Building science and planning”, Khanna Publishers, New Delhi.
3. N.L. Arora and B.L. Gupta, “Building construction”, Satya prakshan publications, New Delhi.
4. C.Rangwala, K.S. Rangwala and P.S. Rangwala, “Engineering materials”, Charotar Publishers.

**Outcomes :**

After completion of this course, students should be able to

1: Classify and demonstrate the occurrence and existence of stone and brick.
2: Identify other materials suitable for building construction.
3: Frame and describe the building components and other statutory requirements.
4: Draw the functional plan and know about services needed in buildings.
5: Describe masonry work, finishing work, construction of RCC beams and columns.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J5133) ADVANCED CONCRETE TECHNOLOGY
**(Professional Elective – II)**

**B.Tech III-Year I-Semester- CIVIL** **L T P C**

**3 0 0 3**

**Objectives :**

1: Use different types of cement as per their properties for different field applications.

2: Learn the usage of different chemical admixture its application.

3: Learn about RMC and Curing process.

4: Learn the properties creep and shrinkage.

5: Learn about Special Concrete properties and their applications.

**UNIT-I**

**Cement:** Cement, Types of Cement, Special Cements like, Rapid Hardening Cement, Sulpahte resisting Cement, Portland Slag Cement, Portland and Pozzolona cement, Air-Entraining Cement, Coloured Cement, Expansive Cement, High alumina cement,very high strength cement and their properties.

**UNIT-II**

**Admixtures and Construction Chemicals:** Admixture, Construction Chemicals, Plasticizers,Super Plasticizers, New generation plasticizers, Retarders, Accelrators, Air-entraining plasticizer, Mineral admixture, Natural pozzolona ,Artificial pozzolona, Flyash, High volume flyash concrete, Silica fume,Rice husk ash, Surkhi, Metakaolin, GGBS, Alcofine, Waterproofing Admixture, Gas forming agentsm alkali-aggregate expansion inhibitors, workability agents, Grouting agents, corrosion inhibiting agents, surface hardners.

**UNIT-III**

**Ready Mix Concrete:** RMC, Chemical admixture, sampling and testing of RMC, Information to be supplied by the purchaser, density of concrete and temperature.

**Curing**: Types and significance of curing.

**UNIT-IV**

**Creep:** Rheological representation of creep, macroscopic and microscopic rheological approach, hydration under sustained load, measurement of creep, factors affecting creep, effects of creep.

**Shrinkage:** Plastic Shrinkage, Drying Shrinkage, Factors affecting Shrinkage, Moisture movement, Autogeneous shrinkage, Carbonation shrinkage, Thermal shrinkage.

**UNIT-V**

**Special Concrete and Concreting Methods:** Light Weight Concrete, Aerated Concrete, No-fines concrete, High density Concrete, Fiber reinforced concrete, slurry infiltrated concrete, Compact reinforced composites, polymer concrete, Cold weathering concreting, Hot weather concreting, Gunite or Shortcrete, ferrocement, Bacterial concrete, Geopolymer concrete, Pervious concrete and self compacting concrete.

**Text books :**

1. A.M.Neville “Properties of Concrete” Low priced Edition – 4th edition.
2. M.S.Shetty “Properties of Concrete” S.Chand & Co. 2004.
3. Relevant IS codes.

**References :**

1. M.L. Gambhir, “Concrete Technology” – Tata Mc. Graw Hill Publishers, New Delhi.
2. A.R. Santha Kumar, “Concrete Technology” Oxford university Press, New Delhi.
3. P.K.Mehta and J.M.Monteiro, “Concrete: Micro structure, Properties and Materials” McGrawHill Publishers.

**Outcomes :**

1. Determine the application of different types of cement.
2. Develop the advanced knowledge on admixture and chemical usage in construction.
3. Develop an advanced knowledge in Ready mix concrete and modern curing processes.
4. To understand the rheology of creep and shrinkage.
5. Understand the engineering properties of special concretes such as high-performance concrete, self-compacting concrete, fibre reinforced concrete, etc.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J5134) WATERSHED MANAGEMENT
**(Professional Elective – II)**

**B.Tech III-Year I-Semester- CIVIL** **L T P C**

**3 0 0 3**

**Objectives :**

1. To learn how to protect, conserve and improve the land of watershed for more efficient and sustained production & to protect and enhance the water resource originating in the watershed.
2. To know Soil erosion and to reduce the effect of sediment yield on the watershed & to rehabilitate the deteriorating lands.
3. To understand Moderate the floods peaks at downstream areas to increase infiltration of rainwater.
4. To study Increase the production of timbers, fodder and wild life resource & to enhance the ground water recharge, wherever applicable.
5. To learn types of cropping and dry land agriculture.

**UNIT – I**

**Introduction and basic concepts:** Concept of watershed, Introduction to watershed management, objectives of watershed development, need for watershed development in India**,** Characteristics of Watershed, different stack holders and their relative importance, holders and their relative importance, Watershed management policies and decision making.

**UNIT – II**

**Watershed Modeling:** Standard modeling approaches and classification, system concept for watershed modeling, overall description of different hydrologic processes, modeling of rainfall runoff process, subsurface flows and groundwater flow, Soil Erosion, Estimation of soil erosion.

**UNIT – III**

**Management of Water Quality:** Water quality and pollution, types and sources of pollution, water quality modeling, environmental guidelines for water quality.

**Water Harvesting**: Rainwater harvesting catchment harvesting harvesting structures, soil moisture conservation, check darns, artificial recharge, farm ponds, and percolation tanks.

**UNIT – IV**

**Storm Water and Flood Management:** Storm water management, design of Drainage system, flood routing through channels and reservoir, flood control and Reservoir operation, case studies of flood damage.

**Drought Management:** Drought assessment and classification, drought analysis techniques, drought mitigation planning.

**UNIT – V**

**Integrated Watershed Management:** Introduction to integrated approach, conjunctive use of water resources.

**Ecosystem Management:** Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture.

**Text Books :**

1. Watershed Management by JVS Murthy, – New Age International Publishers.
2. Water Resource Engineering by R. Awurb s and WP James, – Prentice.

**References :**

1. Land and Water Management by VVN Murthy – Kalyani Publications.
2. Irrigation and Water Management by D.K Majumdar, Printice Hall of India.
3. Watershed management : Guidelines for Indian Conditions by E.M. Tideman, Omega Scientific Publishers.
4. Hydrology and Soil Conservation Engineering by Ghanshyam Das, Prentice Hall India.
5. Watershed Planning & Management by - Dr. Rajvir Singh, Yash Pulishing House.
6. Watersheds - Processes, Assessment and Management by - Pau A. Debarry, John Wiley & Sons.

**Outcomes :**

On completion of this course, students will be able to

1. Protect or conserve the land for watershed.
2. Provide standard quality of water by encouraging vegetation and waste disposal facilities.
3. Check soil erosion and to reduce the effect of sediment yield on the watershed.
4. Enhance the ground water recharge, wherever applicable.
5. Know the different cropping and dry land agriculture.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
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## (J5117) HIGHWAY MATERIAL TESTING LAB

**B.Tech III-Year I-Semester - CIVIL**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Objectives :**

This laboratory course will develop students' knowledge in/on

1: Highway material testing.

2: Desirable properties of pavement materials and their applications.

3: To select the suitable material and recommend the tested material for pavement construction.

**LIST OF EXPERIMENTS**

**Road Aggregates Testing:**

1 Aggregate crushing test.

2 Aggregate abrasion test.

3 Aggregate specific gravity.

4 Aggregate impact test.

5 Aggregate shape test.

6 Aggregate attrition test**Bitumen Testing.**

7 Ductility test for bitumen.

8 Softening point test for bitumen.

9 Penetration test for bitumen.

10 Flash and fire point test for bitumen.

**Laboratory Manual :**

1. "Highway Material Testing Laboratory Manual", prepared by faculty of Department of Civil Engineering.

**Text books** :

1. S.K. Khanna, C.E.G. Justo and A. Veeraraghavan, "Highway Material Testing", Nem Chand and Bros publications.

**Outcomes :**

After completion of this laboratory course, students will be able to…

1: Conduct various tests on pavement materials.

2: Interpret the results obtained from testing.

3: Recommend the tested material for pavement construction.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J5118) COMPUTER AIDED CIVIL ENGINEERING DRAWING

**B.Tech III-Year I-Semester - CIVIL**

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**Objectives :**

This laboratory course will develop students' knowledge in/on

1: Functional planning of building and conventional signs.
2: Different types of doors, windows and stair cases.
3: Developing plan, section and elevation of buildings on a drawing sheet.
4: Developing plan, section and elevation of buildings using AUTOCAD.

**List of Exercises:**

1. Importance and types of buildings, functional planning and conventional signs.
2. Planning of space from Line diagram and development of plan, section and elevation.

**Exercises on Drawing Sheet**

3. Drawings of Various types of doors, windows.
4. Drawing of Dog-Legged stair case.
5. Planning of a residential building with restricted / unrestricted plinth area.
6. Planning of a school building / dispensary.
7. Planning of a Bank with ATM / Post office.
8. Planning of a Dream house / Duplex house.

**Exercises Using AUTOCAD**

9. Planning of a residential building with restricted / unrestricted plinth.
10. Planning of a school building / dispensary.
11. Planning of a Bank with ATM / Post office.
12. Planning of a Dream house / Duplex house.

**Laboratory Manual:**

1. "Computer Aided Building Drawing Laboratory Manual", prepared by faculty of Department of Civil Engineering.

**Text Books:**

2. "National Building Code of India-2017", Bureau of Indian Standards, New Delhi, 1983.
3. Shah, Kale and Patki, "Building Drawing", Tata Mc Graw Hill Book Company Limited, New Delhi.

**Outcomes:**

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

1: Explain functional planning of buildings and illustrate conventional signs.
2: Differentiate types of doors, windows and staircases.
3: Draw the plan, section and elevation of buildings on a drawing sheet.
4: Draft the plan, section and elevation of buildings using AUTOCAD.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (JMC03) CONSTITUTION OF INDIA

**B.Tech III-Year I-Semester - CIVIL**

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**Objectives :**

1. The Constitution is the basic and fundamental law.
2. To introduce concepts and salient features of the constitution Indian.
3. Analyze the Preamble of the Constitution and identify the core values reflected in it;
4. Appreciate the core constitutional values that permeate the salient features of the.
5. Indian Constitution; and examine the nature of the Indian federal system and the parliamentary form of govern.

**UNIT - I**

Introduction to Constitution' meaning of the term,, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

**UNIT - II**

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha.

**UNIT - III**

State Government and its Administration Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

**UNIT - IV**

Local Administration District's Administration head: Role and Importance, Municipalities:Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayatiraj: Introduction, PRI: Zila parishadh, Elected officials and their roles, CEO Zila parishadh: Position and role, Block level: Organizational Hierarchy (Different departments) village level: Role of Elected and Appointed officials,Importance of grass root democracy.

**UNIT - V**

Election Commission Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ ST/OBC and women.

**References :**

1. Books. Recommended.
2. Indian Polity' by Laxmikanth.
3. Indian Administration' by Subhash Kashyap.
4. 'Indian Constitution' by D.D. Basu.
5. 'Indian Administration' by Avasti and Avasti.

**Outcomes :**

1. It also tells us about the rights and also the duties of its citizens.
2. They know about the role, powers of members of local sabha and raj sabha.
3. It lays down the rules to govern the country.
4. Role and function of election commissioner.
5. Power and duties of elected represented s for panchayatraj , ZP, corporation and Importance of democracy.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6119) GEOTECHNICAL ENGINEERING

**B.Tech III-Year II-Semester- CIVIL**

| L | T | P | C |
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**Objectives :**

1. To know the identification and classification of soils.
2. To learn about Permeability, seepage and compaction.
3. To understand about consolidation settlements and principle of effective stress.
4. To learn the different stress distribution in soils.
5. To know the shear strength parameters of soil.

**UNIT – I**

**Basic definitions and phase relationships:** Introduction - Soil formation, Soil structure, Definitions of rock, soil and soil mechanics and Soil problems, Phase diagrams, Water content, Specific gravity, Void ratio, Porosity, Degree of saturation, Density of soil, Mass, weight, volume relationships, Relative density.

**Identification and classification of soils:** Sieve analysis, Stoke's law and its limitations, Grain size distribution curves, Atterberg limits, IS classification of soils, Field identification of soils consistency of soils, Activity, Thixotrophy, Liquidity index, Consistency index and Hydrometer analysis.

**UNIT – II**

**Permeability and Seepage:** Darcy's law and its limitations, Determination of coefficient of permeability, Coefficient of permeability for different soils, Factors affecting permeability of soils, Permeability of stratified soils, Laplace's equation, Stream and potential functions, characteristics of flow net, Construction of flow net, Uses of flow net, Flow net for Anisotropic soils.

**Compaction:** Introduction, theory of compaction, laboratory determination of optimum moisture content and maximum dry density. Compaction in field, compaction specifications and field control.

**UNIT – III**

**Consolidation:** Introduction, comparison between compaction and consolidation, Initial, primary & secondary consolidation, spring analogy for primary consolidation, interpretation of consolidation test results, Terzaghi's theory of consolidation, final settlement of soil deposits, computation of consolidation settlement and secondary consolidation.

**Effective Stress Principle:** Introduction, effective stress principle, nature of effective stress, effect of water table. Fluctuations of effective stress, effective stress in soils saturated by capillary action, seepage pressure, quick sand condition.

**UNIT – IV**

**Stress distribution:** Introduction, stresses due to point load, line load, strip load, uniformly loaded circular area, rectangular loaded area, influence factors, Isobars, Boussinesq's equation, Newmark's influence chart. Contact pressure under rigid and flexiblw area, computation of displacements from elastic theory.

**Shear strength:** Introduction, Normal and Shear stresses, Mohr's circle characteristics of Mohr's circle, Mohr-Coulomb theory and Revised Mohr-Coulomb equation.

**UNIT – V**

**Shear parameters of soils**: Direct shear test, unconfined compression test, Tri axial test, Vane shear test, Importance of drainage conditions, Consolidated Drained, Consolidated Undrained and Unconsolidated Undrained shear tests, Factors affecting the shear strength of clays and sands, Liquefaction, Critical void ratio.

**Text Books:**

1. K.R. Arora, "Soil Mechanics and Foundation Engineering", Standard Publishers, New Delhi.
2. C. Venkatramaiah, "Geotechnical Engineering", New Age Publications.

**References :**

1. Shenbaga R Kaniraj, "Design Aids in Soil Mechanics and Foundation Engineering", Tata McGraw Hill Education Private Limited, New Delhi.
2. T.W. Lambe and Whiteman, R.V "Soil Mechanics", New Age Publications.
3. Craig R.F, " Soil Mechanics" Chapman and Hall.

**Outcomes :**

On completion of this course, students will be able to

1. Classify the soils.
2. Determine permeability, optimum moisture content and maximum dry density.
3. Determine consolidation characteristics of a given soil and effective stress principle of soil.
4. Identify shear strength parameters of different soils.
5. Undersatnad the different shear parameters of soil.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6120) IRRIGATION ENGINEERING AND HYDRAULIC STRUCTURES

**B.Tech III-Year II-Semester- CIVIL**

| L | T | P | C |
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**Objectives :**

1. To know the Concept of reservoir planning and importance of reservoir sedimentation.
2. To learn Gravity and earth dams and perform their stability analysis.
3. To study various types of head works constructed at the head of the canal and types and different components and their purposes.
4. To understand Canal regulation structures and cross drainage structures featuring in the alignment of the channels.
5. To know Classification of canals and design of irrigation canals by Kennedys and Laceys theories.

**UNIT-I**

**Introduction:** Necessity and scope of irrigation: Types of irrigation, Methods of applying water to crops, Soil-water plant relationship, Soil moisture, Field capacity, Permanent wilting point, Function of irrigation water, Duty, Delta, Irrigation frequency, Water requirements of crops, Estimation of consumptive use, Irrigation efficiencies, Benefits and ill effects of irrigation, Crop rotation.

**UNIT-II**

**Dams:** Gravity dams: forces acting on gravity dam, causes of failure of a gravity dam, foundation for gravity dam, drainage and inspection galleries.

**Earth dams**: types of earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

**UNIT-III**

**Canal Irrigation:** Classification of canals, Canal alignment, Channel design based on Kennedy's theory & Lacy's regime theory, IS-code method, Tractive force theory, Channel cross-section in cutting and filling, Balancing depth, Necessity of canal lining, Types of lining, Canal outlets, Causes, Effects and remedial measures of water logging.

**UNIT-IV**

**Diversion Head Works:** Components, layout of diversion head work, Weirs and barrages, Types of weirs, Bligh's creep theory, Lane's theory and Khosla's

theory on design of weirs on permeable foundations, Divide wall, Fish ladder, Under sluice, Silt ejectors and silt excluders, Upstream and downstream protection measures. Canal fall, Necessity, Location and types of falls, Cistern design, Design principles of slopping glacis fall. Head regulators and cross regulators, Design principles of head regulator and cross regulator.

**UNIT-V**

**Hydropower Engineering:** Introduction – Source of energy, Power potential studies, Flow duration and Power duration curves, Load curves, Load factor, Utilization and capacity factor - Classification of hydropower plants, General layout and components, Penstock and water hammer effect. Power house general layout and its classifications based on location.

**Text Books :**

1. R.S. Varshney, et al "Theory and Design of Irrigation of Structures – Vol.I & II", Nem Chend Bros, Roorkee.
2. S.K. Garg, "Irrigation Engineering and Hydraulic Structures", Khanna Publishers, New Delhi.

**References :**

1. Bharat Singh, Irrigation Engineering, Nem Chend Bros, Roorkee.
2. G.L. Asawa, "Irrigation Engineering", New Age Publications, New Delhi.
3. K.R. Arora, "Irrigation, Water Power and Water Resources Engineering", Standard Publications,New Delhi.
4. B.C. Punmia, "Irrigation and Water Power Engineering", Standard Publishers, New Delhi.

**Outcomes :**

On completion of this course, students will be able to

1. Understand importance of reservoir sedimentation in planning for water resources.
2. Perform stability analysis for gravity and earth dams.
3. Analyze the parameters needed in the design of weirs/barrages in permeable soils.
4. Design the irrigation canals, canal regulation structures and cross drainage Structures. Design canals using existing theories.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6121) ENGINEERING GEOLOGY AND ROCK MECHANICS

**B.Tech III-Year II-Semester- CIVIL**

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**Objectives :**

1. To learn about general geology and scope of geological studies.
2. To know about different types of minerals and characteristics of minerals.
3. To know different rocks and the various tests to be done on them.
4. To understand the structural geology and geological problems associated with earthquakes, landslides and reservoir.
5. To know the geological analysis of dams and tunnels.

**UNIT-I**

**General Geology**: Introduction to geology Branches and Scope of geological studies in various civil engineering projects. Departments dealing with this subject in India and their scope of work-GSI, Granite Dimension Stone Cell, NIRM.

**UNIT-II**

**Mineralogy**: Mineral, Origin and composition. Physical properties of minerals, susxeptibility of minerals to alteration, basic of optical mineralogy, SEM, XRD, Rock forming minerals, mega scopic identification of common primary and secondary minerals.

**UNIT-III**

**Petrology**: Formation and classification of rocks, Texture and Structure, Physical properties of rocks for Construction purposes, Engineering properties of rocks , Test for rocks as building stone, Aggregate , Foundation stone, Dimensional and Ornamental rocks, Geological classification of rocks-Igneous, Sedimentary and Metamorphic rock, Megascopic and Microscopic study of granite , Dolorite, Basalt, Pegmatite, Laterite, Conglomerate, Sandstone, Shale, Limestone, Gnesis, Schist, Qurtzite, Marble and Slate, Rock Excavation, Stone aggregates.

**UNIT-IV**

**Rock Mechanics:** Introduction, Structural features like Stratification, Lamination, Bedding planes, Dip, Strike, Fault, Folds, Schirtosity joint and their measurements-unconformities, overlaps, inliers, outliers, Stress deformation of rocks, failure theories and shear strength of rocks, bearing capacity of rocks.

**Geological Hazards**: Rock instability and Slope movements, Causes and effect of Earthquake and Landslides, Remedial measures to prevent damage to engineering structure, Causes and remedial measures of soil Erosion.

**Rock masses as Construction Materials:** Definition, Main features constituting rock masses, main features that affects the quality of rock engineering and design. Classification of rock material strength. Core logging, Rock quality and designation, Rock mass description.

**UNIT-V**

**Dams:** Types of dams, Requirements of Dam sites, Reconnaissance-Preliminary and detailed geological investigation for dam site. Geology of the major dam site of India-Leakage and Silting of Reservoirs-Remedial measures.

**Tunnels**: Purpose of tunneling and geological problems connected with tunneling-Geothermal step, over break, Logging of tunnel and its necessity.

**Text Books :**

1. N. Chenna Keshavulu, “Textbook of Engineering Geology”, Macmillan Publishers, New Delhi.
2. Parbin Singh, “Engineering and General Geology”, S.K. Kataria and Sons, New Delhi.

**References :**

1. K.V.G.K. Gokhale, “Principles of Engineering Geology”, BS Publications, Hyderabad.
2. B.S.S. Narayanaswamy, “Engineering Geology”, Dhanpat Rai and Co, New Delhi.
3. J.C.Harvey, “Geology for Geotechnical Engineers” Cambridge University Press(1982).

**Outcomes :**

On completion of this course, students will be able to

1. Know the scope of geological studies and departments associated with them.
2. Classify different minerals and their properties.
3. Classify different types of rocks and their properties.
4. Describe in detail Structural geology and problem associated with them Describe in detail about geological aspects of dams and tunnels.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6122) DESIGN OF STEEL STRUCTURES

**B.Tech III-Year II-Semester- CIVIL**

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**Objectives :**

This course will develop students' knowledge in/on

1: Steel structures and philosophy of limit state design.

2: Bolted and welded connections.

3: Tension members and compression members.

4: Flexural members and column bases.

5: Steel Girders.

**UNIT – I**

**Structural steel:** Historical development, Advantages and disadvantages of structural steel, Types of structural steel, various design philosophies of structural steel, Specifications and codes, loading and load combinations.

**Principles of Limit State Design**: Limit state design philosophy, Load and material partial safety factors, Design criteria, ultimate limit states and serviceability limit states.

**UNIT – II**

**Bolted Connections**: General considerations, Riveted connections, Bolted connections, specifications for connected parts, Types of bolted joints, Lap and Butt connection, Assumptions made in analysis, Failure of bolted connections, Limit states, Efficiency of joints, Strength of plate connections.

**Welded Connections:** Introduction, Welding, principal types of welds, Types of welded joints, Specifications for fillet welded joints, Strength of fillet welds, Stresses due to individual forces, Combination of stresses, Design of joint.

**UNIT – III**

**Tension Members**: Types of tension members, Behavior of tension members, Net sectional area, Analysis of tension members, Sectional efficiency, Design of tension members, Splices in tension members.

**Compression Members**: Types of column sections, Behavior of compression member, Classification of cross sections, Slenderness for flexural bulking, Design considerations, Analysis and design of compression member, Design of built-up compression member.

**Column Bases:** Design of slab base, Design of gusseted base and grillage foundation.

**UNIT – IV**

**Flexural Members**: Types of sections for beams, Behavior of beams in flexure, Classification of beam cross sections, Stability of beams, Failure modes, Design criteria for beams, Design moment strength for supported beams, Design shear strength of beams, Effective span of beams, Design procedure of simple beams, Built up beam sections, Lateral torsional buckling, Effective length for lateral torsional buckling, Laterally unsupported beams.

**UNIT – V**

**Girders**: Design of welded plate girder: Design of main section, Design of end bearing stiffness and intermediate stiffness.

**Text Books :**

1. M L Gambhir, “Fundamentals of Structural steel design”, Mc Graw Hill.
2. S K Duggal, “Limit state design of steel structures”, Mc Graw Hill.
3. N. Subramanian, “Design of steel structures”, Oxford Higher Education, 2nd edn.

**Reference Books :**

1. S. S. Bhavikatti, “Design of steel structures”, International Publishing House.
2. IS 800-2010, “Code of practice for General construction in steel”, Bureau of Indian standards, New Delhi.
3. SP: 6(1-7), “Handbook for structural engineers”, Bureau of Indian standards, New Delhi, 1980.
4. IS:808, “Dimensions for hot rolled steel beam, column, channel and angle sections”, Bureau of Indian standards, New Delhi, 1989.

**Outcomes :**

After completion of this course, students will be able to….

1: Appraise the importance of steel structures and limit state method of design.
2: Design different types of bolted and welded connections.
3: Classify and design various types of tension and compression members.
4: Design different flexural members and column bases.
5: Design of steel Girders.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6135) STRUCTURAL ANALYSIS - II
**(Professional Elective – III)**

**B.Tech III-Year II-Semester- CIVIL**

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**Objectives:**

This course will develop students' knowledge in/on

1: Analysis of three and two hinged arches.

2: Cable and suspension bridges under different loads.

3: Analysis of indeterminate structures using flexibility matrix method.

4: Analysis of indeterminate structures using stiffness matrix method.

5: Analysis of Indeterminate trusses.

**UNIT – I**

**Three Hinged Arches:** Principle of Arch action, Eddy's theorem, Circular and parabolic arches, Determination of horizontal thrust, Bending moment, Normal thrust and radial shear force. Influence line diagrams.

**Two Hinged Arches:** Principle involved in analysis of two hinged arches. Determination of horizontal thrust, Bending moment, Normal thrust and radial shear force. Influence line diagrams.

**UNIT – II**

**Cables:** Forces in cables subjected to point loads and uniformly distributed load. Cables with supports at same levels and different levels, Length of cable, different support conditions, Influence lines diagrams.

**Suspension Bridges:** Simple suspension bridges with two hinged and three hinged stiffening girders. Bending Moment and Shear Force diagrams, Influence line diagrams.

**UNIT – III**

**Flexibility matrix method-Beams:**

Introduction, determination of internal and external statically indeterminacy for different types of structures. Analysis of beams up to second degree of indeterminacy. Bending moment and shear force diagrams.

**Flexibility matrix method-Frames:** Rectangular portal frames upto 2$^{nd}$ degree of static indeterminacy. Bending moment and shear force diagrams. Analysis of statically indeterminate plane trusses-Up to second degree.

**UNIT – IV**

**Stiffness matrix method -Beams:** Introduction, determination of kinematic indeterminacy for different types of structures. Analysis of continuous beams up to second degree of kinematic indeterminacy, bending moment and shear force diagrams.

**Stiffness matrix method -Frames:** Rectangular portal frames up to second degree of kinematic indeterminacy. Bending moment and shear force diagrams. Analysis of statically indeterminate plane trusses-Up to second degree of kinematic indeterminacy.

**UNIT – V**

**Kani's Method:** Introduction, Application to portal frames, frames with Sway, Multi-storied frames, one bay-two storied structures, Symmetry principles.

**Approximate Analysis of Multi Storied Frames:**
Substitute frame method, portal method and cantilever method.

**Text Books :**

1. G.S. Pandit and S.P. Gupta "Structural Analysis a Matrix analysis of Structures", Tata McGraw-Hill, New Delhi. Latest Edition.
2. C.S.Reddy "Basic Structural Analysis", Tata Mc Graw Hill Education Pvt Ltd., New Delhi.

**Reference Books :**

1. Vazrani and Ratwani, " Structural Analysis vol-1 and vol 2", Khanna Publishers.
2. S. Ramamrutham and R. Narayan "Theory of Structures", Dhanpat Rai.
3. Sujit Kumar Roy and Subrata Chakrabarty, "Fundamentals of structural analysis with computer analysis and applications", S.Chand and Company Ltd., New Delhi.

**Outcomes :**

After completion of this course, students will be able to….

1: Analyze three and two hinged arches.

2: Analyze cables and suspension bridges under different loadings.

3: Develop SFD and BMD for beams and frames using flexibility matrix method

4: Develop SFD and BMD for beams and frames using stiffness matrix method.

5: Analyze Indeterminate Structures.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6136) TRAFFIC ENGINEERING AND MANAGEMENT
**(Professional Elective – III)**

**B.Tech III-Year II-Semester- CIVIL** **L T P C**
**3 0 0 3**

**Objectives :**

This course will develop students' knowledge in/on

1. To learn about Elements, characteristics and measures of traffic flow system.
2. To know Various types of traffic studies and surveys, causes and preventive measures for traffic accidents.
3. To study Concepts of traffic signaling, rotaries and interchanges in highways.
4. To study the parking study and design of parking facility.
5. To understand Traffic control devices, transportation planning and warrants for sign provision.

**UNIT – I**

**Traffic Characteristics:** Road user characteristics, Perception reaction, Driver strategy. Characteristics of vehicle, Kinematics and dynamics of vehicle.

**Traffic Flow and Capacity:** Nature of traffic flow, Relation between speed, Flow and density. Traffic capacity, Level of service (LOS), Basic definitions, Factors affecting capacity and LOS, Capacity of urban/rural highway with or without access control.

**UNIT – II**

**Traffic Studies and Surveys:** Traffic volume studies, Methods and presentation of data. Origination-destination surveys, Methods and uses. Speed studies, Methods and presentation of data. Time and delay studies, Methods, Merits and demerits.

**Accident Investigations:** Traffic accident terminology, Accident studies-causative factors of road accidents, Accident analysis, Accident prevention.

**UNIT – III**

**Traffic Signals:** Purpose of traffic signalling, Signal warrants. Signal design, Webster's method and IRC method. Signal coordination, Terminology, Principles of coordinated operations.

**Rotary and Interchanges:** Channelization, Design of intersection, Capacity of rotary, Interchanges at grade and grade separated.

**UNIT-IV**

**Design of Parking Facilities:** Types of Parking facility, On street Parking and Off street parking facilities, Parking studies and analysis, Parking inventory study, Parking usage study by patrolling, Questionnaire survey, Cordon surveys, Evaluation of parking parameters, Parking Accumulation, Parking Load, Parking turnover, parking Index, Parking Volume.

**UNIT-V**

**Traffic Planning and Management:** Introduction**,** Objectives and policies, Urban transport planning process, Travel demand forecasting, Trip generation, Trip distribution and traffic assignment, Advanced method of transportation planning, Traffic Management.

**Text Books :**

1. S.K Khanna, CEG Justo, A. Veeraraghavan, "Highway Engineering", Nem Chand and Bros.
2. L. R. Kadiyali, "Traffic Engineering and Transportation Planning" Khanna Publishers, 7th edn.

**References :**

1. Relevant IRC Codes IRC-53, IRC-65, IRC-64, IRC-67, IRC-66.
2. Fred Mannering and Walter Kilareski., "Principles of Highways Engineering and Traffic Analysis" - John Wiley and Sons Publication.
3. "Highway Capacity Manual", 2000.

**Outcomes :**

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

1. Explain the elements of traffic engineering, their characteristics and effects on traffic system.
2. Discuss the Different traffic studies and surveys, causes and preventive measures for traffic accidents.
3. Determine the signal time and state the different types of rotaries and interchanges.
4. Determine the parking facility available and design the parking facilities.
5. Explain the different traffic control devices and stages of transportation planning & Management.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6137) EARTHQUAKE ENGINEERING
**(Professional Elective – III)**

**B.Tech III-Year II-Semester- CIVIL**

| L | T | P | C |
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**Objectives :**

This course will develop students' knowledge in/on

1: Engineering Seismology.

2: Basic of theory of vibration related to dynamic motion.

3: Single and multi degree of freedom system.

4: Vibration analysis and various cases of continuous systems.

5: Basics of earthquake engineering.

**UNIT – I**

**Engineering Seismology:** Earthquake phenomenon causes of earthquakes, Faults ,Plate tectonics, Seismic waves-terms associated with earthquakes, magnitude/Intensity of an earthquake, scale, energy released –earthquake measuring instruments-seismoscopy, Seismograph, accelerograph-strong ground motions, seismic zones of India.

**UNIT – II**

**Fundamentals of Structural Dynamics**: 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.

**Theory of Vibrations:** Introduction, Elements of vibratory system, Degrees of Freedom, Oscillatory motion, Simple Harmonic motion, Vectorial representation of simple harmonic motion, Free vibrations of single degree of freedom system, Undamped and damped vibrations, Critical damping, Logarithmic decrement, Forced vibration of single degree of freedom systems, Harmonic excitation, Dynamic magnification factor.

**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.

**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.

**UNIT – IV**

**Vibration Analysis**: Introduction, Stodola method, Fundamental mode analysis, Analysis of second and higher modes, Holzer method, Basic procedure.

**Continuous Systems**: Introduction, Flexural vibrations of beams, Elementary case, Derivation of governing differential equation of motion, Analysis of Undamped free vibrations of beams in flexure, Natural frequencies and mode shapes of simple beams with different end conditions.

**UNIT – V**

**Basics of Earthquake Analysis**: Introduction, Excitation by rigid base translation, lumped mass approach, SDOF and MDOF systems.

**Application of I.S. Code method:** I. S. Code methods of analysis, introduction to seismic coefficient method and response spectrum method.

**Text Books:**

1. Mario Paz, “Structural Dynamics” C.B.S Publishers, New Delhi.

**Reference Books :**

1. Clough & Penzien, “Dynamics of Structures”, McGraw Hill.
2. Anil K. Chopra, “Dynamics of Structures”, Pearson Education (Singapore), Delhi.
3. I.S: 1893 - 1984, “Code of practice for Earthquake resistant design of Structures” and latest I.S: 1893 - 2002 (version) Part-1.

**Outcomes :**

After completion of this course, students will be able to….

1: Understand the Seismology.

2: Apply the theory of vibrations to structural dynamics.

3: Evaluate the Response for Single and multi degree of freedom system.

4: Apply the vibration analysis for beams.

5: Describe various methods of earthquake analysis using IS Code.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6123) GEOTECHNICAL ENGINEERING LAB

**B.Tech III-Year II-Semester - CIVIL**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Objectives :**

1. To know Classification of Indian soils.
2. To Determination of coefficient of permeability.
3. To Determination compaction characteristics.
4. To Determination of shear strength parameters.

**List of experiments :**

1. Determination of Consistency Limits:
   a) Liquid limit (b) Plastic limit
2. Classification of Coarse Grained Soil through Sieve Analysis.
3. Determination of Insitu Density by
   a) Core cutter method (b) Sand replacement method
4. Determination of OMC and Maximum Dry Density by Compaction Method.
5. Determination of Coefficient of Permeability.
   a) Constant head method b) Falling head method
6. Determination of Coefficient of Consolidation.
7. Determination of Unconsolidated Undrained Shear Strength Parameters Direct Shear test.
8. Determination of Unconsolidated Undrained Shear Strength Parameters Unconfined compression Test.
9. Demonstration of Tri- Axial Shear test.
10. Demonstration of California Bearing Ratio test.
11. Demonstration of Vane Shear test.

**Laboratory Manual:**

1. "Geotechnical Engineering Laboratory Manual", prepared by faculty of Department of Civil Engineering.

**Text Books:**

1. B. M. Das, "Soil Mechanics Laboratory Manual", Oxford University Press, 8th edn, 2012.
2. SP 36 (Part – I): 1987-"Compendium of Indian Standards on Soil Engineering", Bureau of Indian Standards, New Delhi.

**Outcomes:**

On completion of this laboratory course, students will be able to

1. Classify the given soil.
2. Determine coefficient of permeability of different soils.
3. Determine optimum moisture content and maximum dry density for different soils.
4. Determine shear strength parameters.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J6124) ENGINEERING GEOLOGY LAB

**B.Tech III-Year II-Semester - CIVIL**

| L | T | P | C |
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| 0 | 0 | 3 | 1.5 |

**Objectives :**

This laboratory courses will develop student's knowledge in/on

1. Identify the mineral name by studying the properties.
2. Identify the rocks name by studying the properties.
3. Interpretation of geological maps.

**List of Exercises :**

1. Study of physical properties and identification of minerals.
2. Study of physical properties and identification of Igneous rocks.
3. Study of physical properties and identification of Sedimentary rocks.
4. Study of physical properties and identification of Metamorphic rocks.
5. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
6. Simple Structural Geology problems.

**Laboratory Manual :**

1. "Engineering Geology Laboratory Manual", prepared by faculty of Department of Civil Engineering.

**Text Books :**

1. N. Chenna Keshavulu, "Textbook of Engineering Geology", Macmillan Publishers, New Delhi.
2. Parbin Singh, "Engineering and General Geology", S.K. Kataria and Sons, New Delhi.

**Outcomes :**

On completion of this laboratory course, students will be able to

1. Identify various Minerals.
2. Identify the rocks.
3. Interpret and draw the sections for geological maps showing horizontal beds, vertical beds, inclined beds, folds, faults, unconformities.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7125) ESTIMATION AND COSTING

**B.Tech IV-Year I-Semester- CIVIL**

| L | T | P | C |
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| 2 | 0 | 0 | 2 |

**Objectives :**

This course will develop students' knowledge in/on

1: Measurements and Estimation of various elements in Civil Engineering works.

2: Detailed Estimate for a given building and preparing a tender document.

3: Writing specifications, performing rate analysis and

4: Earthwork for roads and preparing valuation report for a residential building.

5: Types of contract and estimating Civil Engineering works.

**UNIT-I**

**Elements of Quantity Surveying:** Scope of Civil Engineering works- Standard terminology used in quantity Surveying- Standard method of measurement.

**Measurements:** General, Units of measurements, Requirements of estimation, Advantages, Estimation of Isolated and Step foundations. Importance and maintenance of M-Book, Measurement of earth work, Brick Masonry work, Concrete Work, Prestressed concrete work, steel Work-Timber works.

**UNIT-II**

**Estimation of Buildings:** Different types of estimates- Methods of estimation: Centre line method and individual wall method-Calculation of quantities of brick work, RCC, PCC, Plastering, White washing and Painting, Estimate of wood works for doors and frames. Preparation of detailed and abstract estimate for framed structures –RCC work, steel work including bar bending schedule.

**UNIT-III**

**Specification and Rate analysis:** Objective of specifications, General and detailed specifications for various items of work – Earth work excavation, Lime mortar, Cement concrete, damp proof course, Form work, Brick and stone masonry, Flooring, Painting and wood work. Purpose and requirements of schedule of rates, Procedure of rate analysis. Obtaining rate for different works namely cement works, DPC, Stone masonry, Brick masonry, Plastering, Flooring, and Painting.

**UNIT-IV**

**Road Estimating:** Estimate of Earthwork for Roads.

**Valuation:** Objective of valuation - Definition of various terms such as market value, Book value, Assessed value, Mortgage value, Replacement value, Capital cost, Cost escalation, Sinking fund and Depreciation methods. Fixation of rent, Preparation of valuation report for residential building.

**UNIT-V**

**Tenders:** Types of tender, Tender notice, Earnest money, Security deposit, Liquidated Damages, Arbitration, Escalation. Costing and preparation of tender document.

**Contracts:** General requirements of contract, Types of contract, Conditions, Termination of contract. Departmental procedures for execution of works.

**Text Books :**

1. B. N. Dutta, “Estimating and Costing in Civil Engineering”, UBS Publishers, New Delhi, 2016.
2. M. Chakraborty, “Estimating, Costing, Specification and Valuation in Civil Engineering”.

**Reference Books** :

1. D.D Kohli and R.C Kohli, “A Text Book of Estimating and Costing (Civil)”, S. Chand and Company Ltd.

**Outcomes :**

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

1: Discuss types of measurements pertaining Civil Engineering works.
2: Prepare detailed estimate for a building.
3: Perform rate analysis as per Schedule of Rates(SOR) and specifications.
4: Estimate the Earthwork for roads and Prepare valuation report for a Residential building.
5: Tenders and preparation of tender document Prepare detailed contract document and estimate for different types of Civil Engineering works.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7126) ENVIRONMENTAL ENGINEERING

**B.Tech IV-Year I-Semester- CIVIL** **L T P C**
**3 0 0 3**

**Objectives :**

1. To learn Quality and quantity aspects of water.
2. To understand Operations involved in water treatment and distribution.
3. To know Sewage analysis and hydraulic design of sewer.
4. To study various Methods of sewage treatment and their operations.
5. To know Air & Noise pollution- their treatment and Solid Waste Management.

**UNIT – I**

**Water Demand:** Classification of sources of water supply, Choice of source, Types of water demand, Per Capita Demand, Factors affecting per-capita demand, Factors affecting water losses, Fluctuations in demand and its effects on different components of water supply scheme, Design period, Population forecasting methods, Fire demand.

**Water Quality**: Physical, chemical and biological characteristics of water quality, Water borne diseases and their control, Quality standards for municipal supplies

**UNIT – II**

**Purification of Water**: Purification of water – water treatment: Operations involved in water treatment, Screening, Plain sedimentation, Sedimentation aided with coagulation, Filtration, Disinfection, Softening, Aeration.

**Distribution System:** General requirements, Layouts of distribution networks, Methods of supply, Systems of supply, Distribution reservoirs – types, functions, Storage capacity of distribution reservoirs, Design of distribution networks, Analysis of complex pipe networks-Hardy Cross method, Appurtenances in distribution system.

**UNIT – III**

**Quality and Quantity Perspectives of Sewage**: Physical, chemical and biological characteristics of sewage, Analysis of sewage, Biological Oxygen Demand and Dissolved Oxygen profile-processes and kinetics involved, Sewerage systems-merits and demerits, Estimation of dry weather flow, Estimation of storm water flow.

**Sewer and Sewer Appurtenances**: Hydraulic design of sewer, Hydraulic formulae for design of sewers, Minimum and maximum velocity of flow in sewers, Materials for sewers, Joints in sewers, Shapes of sewers, Sewer appurtenances.

**UNIT – IV**

**Sewage Treatment**: Layout and general outline of various units in a waste water treatment plant Process flow diagram, Primary treatment, Screens, Grit chamber, Skimming Tanks, Principles and design of biological treatment, trickling filters Sedimentation Tanks, Theory and Design, Activated sludge process.

**Secondary Treatment of Sewage:** Sewage filtration, Construction and design of Oxidation Ponds, Oxidation ponds, Aerated lagoons, Rotating biological contractors, Sludge digestion tank, Treatment and disposal of sludge, On-site disposal methods.

**UNIT-V**

**Air and Noise Pollution:** Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air pollution – Occupational hazards, Urban air Pollution , Automobile pollution, Air quality standards , control measures for air pollution, construction and limitations.

**Noise:** Basic Concept, measurement and various control methods.

**Solid Waste Management:** Municipal solid waste, Composition and various chemical and physical parameters of MSW, MSW Management: Collection, transport, treatment and disposal of MSW. Types and nature of hazardous waste as per the HW schedules of regulating authorities.

**Text Books :**

1. P.N.Modi, “Water supply Engineering- Environmental Engineering–I”, Standard Book House., New Delhi.
2. P.N.Modi, “Sewage Treatment and Disposal – Environmental Engineering-II”, Standard Book House., New Delhi.

**References :**

1. Howard S. Peavy, Donald R. Rower and George Tchobanoglous, “Environmental Engineering”, Mc Graw-Hill International Edition.
2. The Expert Committee, CPHEEO “Manual on Water Supply and Treatment”, Ministry of Urban Development, Govt. of India, New Delhi.
3. The Expert Committee, CPHEEO, “Manual on Sewerage and Sewage Treatment Systems”, Ministry of Urban Development, Govt. of India, New Delhi.

**Outcomes :**

On completion of this course, students will be able to

1. Analyze problems related to analysis of water quality and quantity.
2. Design various unit processes of water treatment and distribution.
3. Explain various parameters of sewage and design the sewerage systems.
4. Explain and design various units of sewage treatment.
5. Analyze and Treat the problem associated with Air & Noise pollution and Solid Waste Managemet.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7138) FOUNDATION ENGINEERING
**(Professional Elective – IV)**

**B.Tech IV-Year I-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

1. To learn Shallow and deep foundations.
2. To know Bearing capacity of soils and foundation settlements.
3. To understand the Expansive soils.
4. To study Earth pressures on foundations and retaining structures.
5. To know Machine Foundation.

**UNIT – I**

**Site investigation and Types of foundation:** Types of exploration, Types of samplers, SPT test, Static and dynamic cone penetration tests, Plate load test, Types of foundations, Different types of loads coming on foundations, Choice of foundations.

**Shallow foundations:** Bearing capacity- Definitions and theories-Terzaghi, Meyerhof, Skempton and Vesic, Terzaghi's bearing capacity equation, Effect of size, shape, Ground water table, depth of embedment and load inclination on bearing capacity, Field determination of bearing capacity, Settlement of foundations, Elastic settlements, Permissible settlements.

**UNIT – II**

**Deep Foundations:** Pile Foundations-Classification of piles, Load bearing capacity of piles, Static formulae, Negative skin friction, Dynamic formulae, ENR and Hiley's formulae, Pile load tests, Group action of piles, Pile Groups in sand, gravel and clay, Settlement of pile groups.

**UNIT – III**

**Caissons:** Types of well foundations, Construction of well foundation, Sinking of open wells, pneumatic caissons, Box caissons and rectification methods.

**Foundations on expansive soils:** Identification of expansive soils, Problems associated with expansive soils, Design considerations for foundations in expansive soils, under reamed piles.

**UNIT – IV**

**Slope stability analysis:** Introduction, Infinite and Finite slopes, Types of slope failures, Different factors of safety, Stability analysis of finite slope by Swedish and Friction Circle methods, Taylor's stability number, Stability analysis of earthen dam for different conditions.

**Earth Pressures:** Introduction, Types of lateral earth pressure – Active, at rest and passive earth pressure, Rankine's and Coulomb's earth pressure theories, Culmann's Graphical solution.

**UNIT – V**

**Machine foundations:** Types of machine foundations, Basic definitions, Degree of freedom of block foundation, Field methods of determining design parameters, Cyclic plate load test, block vibration test, Design criteria and detailing for machine foundations, Vibration analysis of machine foundation**.**

**Text Books :**

1. K.R. Arora, "Soil Mechanics and Foundation Engineering", Standard Publishers, New Delhi.
2. Shashi K. Gulhati, Manoj Datta, "Geo Technical Engineering" , Mc Grawhill Publications, New Delhi.

**References :**

1. Srinivasulu and Vaidyanathan, "Handbook of Machine Foundations", Tata Mc Graw Hill Publications, New Delhi.
2. Shenbaga R Kaniraj, "Design Aids in Soil Mechanics and Foundation Engineering", Tata McGraw Hill Education Private Limited, New Delhi.

**Outcomes :**

On completion of this course, students will be able to….

1. Analyze shallow and deep foundations.
2. Calculate the bearing capacity of soils and foundation settlements.
3. Identify the problems associated with expansive soils.
4. Determine the earth pressures on foundations and retaining structures.
5. Analyze Machine Foundation.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7139) RAILWAY AND AIRPORT ENGINEERING
**(Professional Elective – IV)**

**B.Tech IV-Year I-Semester- CIVIL** **L T P C**

**3 0 0 3**

**Objectives :**

1. To learn Structure and organization of railways, development of railways and its requirements.
2. To study Railway track components as per requirements.
3. To study geometric design of railway line and crossings.
4. To Identify and interpreting the process related to airport planning and also related surveys.
5. To understand Zoning laws, approach zone and runway length & factors controlling taxiways and design of airfield pavement.

**UNIT – I**

**History of Indian railways:** Developments in Indian railways, Organization, Railway finance, Classification of railway lines, Undertakings under ministry of railways.

**Railway gauge:** Gauges, types, choice of gauge, Problems caused by change of gauge, Importance of good alignment, Basic requirements of an ideal alignment, Traffic, reconnaissance, Preliminary and final location surveys.

**UNIT – II**

**Tracks, Rails and Sleepers:** Requirement of good track, maintenance, Forces acting on track, coning of wheels, Functions of rails and types of rail, Rail wear, Rail failure detection, Functions and requirements of sleepers, Sleeper density, Types of sleepers.

**Ballast, Sub-grade and Creep of Rails:** Types and functions of ballast, Requirements of good ballast, Design of ballast section, Specification, tests on ballast, Slopes, execution of earth work in embankment and cutting, Failure of railway embankment, Theories for development of creep, Causes, effects of creep, Measurement of creep, Adjustments of creep.

**UNIT – III**

**Geometric Design:** Details of geometric design, Gradients, grade compensation, Circular curves, Super elevation, safe speed, Transition curves, widening of curves, Vertical curves, Check rails.

**Points, Crossing, Level Crossing:** Important terms, switches, Tongue rails, Crossing, Turnouts, Layout of turnout, Classification of level crossing, Dimensions.

**UNIT – IV**

**Air transportation:** Structure and organization of air transport, Directorate of civil aviation, National & International airports authority, Airports Authority of India, International Civil Aviation Organization.

**Airport characteristics and airport planning:** Relation between aircrafts and airports, Requirements of aircraft types, Field length regulations, Weight components, Aero plane component parts, Classification of flying activity, Relation of aircraft to landing facility, Airport master plan, Regional planning, Site selection, Surveys.

**UNIT – V**

**Runway design:** Zoning laws, Classification of obstructions and approach zone, Runway orientation, Basic runway length, Correction for elevation, Temperature and gradient, Runway geometric design.

**Airport layout:** Airport, Runway, gate and taxiway capacities, Airport and Runway configuration, Intersection design, Terminal and building area, Parking, Apron, Hanger**.**

**Taxiway design:** Factors controlling taxiway layout, Geometric design standards for taxiway, Exit taxiways.

**Text Books :**

1. Satish Chandra and M.M. Agarwal , “Railway Engineering”, Oxford Publishers.
2. S.C.Saxena and S.P.Arora, “A Text Book of Railway Engineering”, Dhanpat Rai and Sons, Delhi.
3. S.K Khanna, M.G. Arora and S.S. Jain, “Airport Planning and Design”, Nem Chand and Bros.

**References :**

1. J.S. Mundrey, “Railway Track Engineering”, Tata McGraw Hill.
2. Rangwala., “Railway Engineering “ Charotar Publishers.
3. Norman Ashford, Paul H. Wright., “Airport Engineering”, Wiley Publications.
4. Rangwala, “Airport Engineering”, Charotar Publishers.
5. Subhash C.Saxena, “Airport Engineering and planning” CBS Publications.

**Outcomes :**

On completion of this course, students will be able to

1. Explain the importance of railways and requirements of alignment.
2. Design the elements of railway track.
3. Design the railway geometric design and crossing.
4. Analyze the planning process for airports. Compute runway length, airport layout & design air field pavements.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7140) PRE STRESSED CONCRETE STRUCTURES
**(Professional Elective – IV)**

**B.Tech IV-Year I-Semester- CIVIL** **L T P C**
**3 0 0 3**

**Objectives :**

This course will develop students' knowledge in/on

1: Prestressing of concrete and their losses.

2: Analysis and design of sections in flexure.

3: Transfer of prestress and design in shear.

4: Analysis of Beams.

5: Analysis of indeterminate prestressed concrete members.

**UNIT – I**

**Prestressing Systems:** Historical development, concepts of pre-stressing, Advantages, Pre-tensioning and Post-tensioning, Prestressing Systems-Hoyer, Freyssinet, Magnel blaton and Lee-Mc call system, material properties, Need for High strength steel and High strength concrete.

**Analysis of Sections:** Stress concept, Strength concept, Load balancing concept, Effect of loading on the tensile stresses in tendons, Effect of tendon profile on deflections, Factors influencing deflections, Calculation of Short term and long term deflections.

**UNIT – II**

**Losses of Prestress**: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, relaxation of steel, slip in anchorage, bending of member and frictional loss.

**Design of Section for Flexure**: Allowable stresses, Elastic design of simple beams having rectangular and I-section for flexure, kern lines, Cable profile and cable layout.

**UNIT – III**

**Design of Section for Shear:** Shear and Principal Stresses, Improving shear resistance by different prestressing techniques, horizontal, sloping and vertical prestressing, Analysis of rectangular and I–beam, Design of shear reinforcement, Indian code provisions.IS:1343-2012.

**Transfer of Prestress**: 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 approximate, Guyon and Magnel methods, Anchorage zone reinforcement.

**UNIT – IV**

**Composite Beams**: Different types –Propped and Unpropped, Stress Distribution, different shrinkage, Analysis of composite beams, general design Consideration.

**Deflection:** Importance of control of deflection, factors influencing deflection, short term deflection of uncracked beams-prediction of long term deflection, BIS code requirements.

**UNIT – V**

**Statically Indeterminate Structures**: Advantages & disadvantages of continuous PSC beams, primary and secondary moments – P and C lines, Linear transformation concordant and nonconcordant cable profiles, Analysis of continuous beams and simple portal frames.

**Prestressed concrete poles:** General Features, advantages, shapes of PSC poles, Design considerations, partially prestressed pretension poles.

**Text Books :**

1. Krishna Raju N, “Prestressed concrete”, Tata McGraw Hill Company, New Delhi.
2. Mallic S.K. and Gupta A.P., “Prestressed concrete”, Oxford and IBH publishing Co. Pvt. Ltd, 4th edn., 1987.

**Reference Books :**

1. Lin T.Y. “Design of prestressed concrete structures”, John Wiley and sons and Asia Publishing House, Mumbai, 3rd edn., 1982.
2. G. S.Ramaswamy “Modern prestressed concrete design”, Arnold Heinimen, New Delhi.
3. N. Rajagopalan “Prestressed Concrete”, Alpha Science publishers, New Delhi.
4. ED Nawy “Fundamentals of PreStressed”, Concrete.

**Outcomes :**

After completion of this course, students will be able to….

1: Appraise the concept of Prestressing in concrete.
2: Design prestressed concrete members in flexure.
3: Appreciate the transfer of prestress in concrete.
4: Analyze a continuous beam and design beams and poles.
5: Analyze a indeterminate structures.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7141) REPAIRS AND REHABILITATION OF STRUCTURES
**(Professional Elective – V)**

**B.Tech IV-Year I-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1: Distress and damages of buildings.

2: Types of NDT.

3: Corrosion in Reinforcement.

4: Repairs of Structures.

5: Health monitoring of structures.

**UNIT – I**

Introduction, Deterioration of Structures, Distress in the Structures, Causes and Prevention Mechanism of Damage, Types of Damage.

**UNIT – II**

Inspection and Testing, Symptoms and Diagnosis of Distress, Damage Assessment, Partially destructive Testing, Non- Destructive Testing (NDT) and Methods.

**UNIT – III**

Corrosion of Steel Reinforcement, Causes, Mechanism and Prevention. Damage of Structure due to Fire, Fire rating Of Structures, Phenomena of Desiccation.

**UNIT – IV**

Repair of Structure ,Common types of Repair, Repair in Concrete Structure, Repair in Under water Structures, Guniting, Shot Create, Underpinning, Strengthening of Structures, Strengthening Methods, Retrofitting, Jacketing.

**UNIT – V**

Health Monitoring Of the Structures, Use of Sensors, Building Instrumentation.

**Text Books:**

1. B.L.Gupta and Amit Gupta, "Maintenance and repair of Civil Structures", Standard Publication.

2. A.R.Santakumar, “Concrete Technology” Oxford University Press.

**References:**

1. Bungey, “Non-Destructive Evaluation of concrete Structures” Surrey University Press.
2. W.H.Ranso, “Concrete Repairs and Maintenance Illustrated” RS Means Company.

**Outcomes :**

After completion of this course, students will be able to….

1 Understand about distress & damage of structures.

2: Understand about practical and NDT.

3: Understand about Causes and prevention of corrosion of steel.

4: Understand about different techniques of repairs of Structures.

5: Able to know about Monitoring of Structures by Sensors.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7142) ADVANCED STRUCTURAL DESIGN
**(Professional Elective – V)**

**B.Tech IV-Year I-Semester- CIVIL** **L T P C**

**3 0 0 3**

**Objectives :**
This course will develop students' knowledge in/on
1: Design of Retaining Walls.
2: Design of water Tanks.
3: Design of Flat Slabs.
4: Design of Concrete Bridges.
5: Design of RCC Chimney, Bunker and silos.

**UNIT – I**
Design and detailing of cantilever type of retaining walls- Stability Check. Principles of Counterfort Retaining walls and shelf type retaining walls.

**UNIT – II**
Design of Circular and rectangular water tanks at ground level and elevated with staging.

**UNIT – III**
Design of Flat Slab – Design of Raft and pile foundation.

**UNIT – IV**
Design of concrete bridges- IRC loading Design of stab bridge, T-Beam girder bridge.

**UNIT – V**
Design of RCC Chimneys, Bunkers and Silos.

**Text Books :**
1. PC Varghese, "Advanced Reinforced Concrete Structures", Pranties Hall of India Pvt Ltd.
2. Krishna Raju, " Advanced Reinforced Concrete Structures".
3. S Ponnuswamy, "Bridge Engineering", Tata McGraw Hill Co.

**References :**
1. B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, "Reinorced Concrete Structures Vol-II", Laxmi Publications.
2. D.John Son Victor, "Essential of Bridge Engineering", IBM Publications Co., Pvt Ltd.

**Outcomes:**
After completion of this course, students will be able to….
1: Design of Retaining Walls.
2: Design of water Tanks.
3: Design of Flat Slabs.
4: Design of Concrete Bridges.
5: Design of RCC Chimney, Bunker and silos.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7143) EARTH RETAINING STRUCTURES
**(Professional Elective – V)**

**B.Tech IV-Year I-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1: Design principles of earth and rock fill dams

2: Design of sheet pile walls and earth retaining walls

3: Loads on conduits

4: Design components of braced cuts.

5: Design of cofferdams.

**UNIT – I**

**Earth Dams:** Introduction, Types of earthen dams, Site selection, Methods of construction, Densities and their relations, Pore-water pressure and its significance in the design of earth dams, Dam failures- Hydraulic, Seepage and Structural failures, Design criteria of earth dams, Design for slope stability under critical conditions, Seepage control in earth dams, Design of filters, Slope protection, Advantages and disadvantages of earthen dams.

**Rock fill dams:** Definition, Site selection, Types of rock fill dams, Construction methods, Merits and demerits of rock-fill dams.

**UNIT – II**

**Earth retaining Walls:** Types of retaining walls, Design principles of retaining walls, Gravity and cantilever retaining walls, Constructional aspects of retaining walls, Expansion and contraction joints.

**Underground Conduits:** Types of conduits- positive, Negative projecting and ditch conduits, Imperfect ditch conduit, Tunnel conduits, Loads on Conduits, Construction of conduits.

**UNIT – III**

**Shafts and Tunnels:** Arching in soils, Stresses in the vicinity of vertical shafts and tunnels.

**Sheetpile Walls:** Types of sheet piles, Use of sheet pile walls, Design of cantilever sheet pile walls in granular and cohesive soils, Design of anchored sheet pile walls by free earth method in granular and cohesive soils, Rowe's moment reduction theory, Design of anchored sheet pile wall by fixed earth method, Design of anchors, Location of anchorage.

**UNIT – IV**

**Braced cuts:** Introduction, Lateral earth pressure on sheeting in sand and clayey soils, Types of sheeting and bracing system, Design components of braced cuts, Safety of bottom of excavation against boiling and heave.

**UNIT – V**

**Coffer Dams:** Uses of coffer dams, Types of coffer dams, Relative merits and demerits, Design of circular cellular coffer dam by TVA method on rocks and on soil.

**Text Books :**

1. K.R.Arora, "Soil Mechanics and Foundation Engineering", Standard Publishers Distributors, Delhi. 9th edn., 2013.
2. Swami Saran, "Analysis and Design of Substructures limit state design", Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.9th edn., 2013.

**Reference Books :**

1. Braja M.Das, "Principles of foundation engineering" , International Student edn.
2. Peck, Hanson and Thornborn, "Foundation Engineering", John Wiley Publications, New York.

**Outcomes :**

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

1: Learn design principles of earth and rock fill dams.

2: Design earth retaining walls and conduits.

3: Design sheet pile walls.

4: Design the components of braced cuts.

5: Design of cofferdams.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7127) ENVIRONMENTAL ENGINEERING LAB

**B.Tech IV-Year I-Semester - CIVIL**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Objectives :**

1. To study Physical analysis of water sample.
2. To study Chemical analysis of water sample.
3. To Determine the dissolved oxygen in water sample.

**List of Experiments :**

1. Determination of Acidity.
2. Determination Alkalinity of water sample.
3. Determination pH and Turbidity of water sample.
4. Determination of Total Solids, Total dissolved solids, Suspended solids and Conductivity of water sample.
5. Determination of Hardness of water sample.
6. Determination of Chlorides.
7. Determination of Optimum Coagulant dosage of water sample using Jar test.
8. Determination of Chlorine demand.
9. Determination of Chloride content of water sample.
10. Determination of Dissolved Oxygen of water sample.
11. Determination of Biological Oxygen Demand of water sample.
12. Determination of Chemical Oxygen Demand of water sample..25

**Laboratory Manual:**

1. “Environmental Engineering Laboratory Manual”, prepared by the faculty of Civil Engineering.

**References :**

1. B. Kotaiah and Dr. N. Kumara Swamy, “Environmental Engineering Laboratory Manual”, Charotar Publishing House Pvt. Ltd.

**Outcomes:**

On completion of this laboratory course, students will be able to

1. Characterize the quality of water for suspended matter by physical tests.
2. Evaluate the quality of water for hardness, chlorides using chemical analysis.
3. Measure Dissolved Oxygen concentration to assess the quality of water.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J7128) STRUCTURAL ENGINEERING DETAILING LAB

**B.Tech IV-Year I-Semester - CIVIL**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Objectives:**

This laboratory course will develop students' knowledge in/on

1: Detailing of Beams, Slab, Columns' and Footings.

2: Detailing of RCC Water Tank.

3: Detailing of steel braced column and grillage foundation.

**List of Exercises:**

Preparation of working drawings using AUTO CAD for the following structural elements as per SP-34, the elements are to be designed prior to preparation of drawings.

1 Detailing of R.C.C beamsa) Simply Supported Beam.b) Continuous Beam. c) Cantilever Beam.d) T-Beam. e) L Beam.

2 Detailing of R.C.C Slabsa) One Way and Two Way Slabs. b) Simply Supported Slab. c) Continuous Slab.

3 Detailing of Tied Columns and Spirally Reinforced Columns.

4 Detailing of Footings for R.C.C Columns. a) Combined Footings. b) Isolated Footings. c) Rectangular and Trapezoidal Footings.

5 Detailing of Beam Column steel joints.

6 Detailing of RCC Water tank/Retaining wall.

7 Detailing of steel braced column.

8 Detailing of grillage foundation.

**Laboratory Manual:**

1. "Structural Engineering Detailing Laboratory Manual", prepared by the faculty of Civil Engineering.

**References:**

1. "Hand book on Concrete Reinforcement and Detailing-SP 34-1987", Bureau of Indian Standards-New Delhi.
2. B.C Punmia, A.K.Jain. "R.C.C Designs", Laxmi publishers, New Delhi, 2013.
3. Arya and Ajmani , "Design of steel structures" Nem Chand and Bros, Roorkee, U.P.

**Outcomes:**

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

1: Prepare working drawings for Beams, Slabs, Columns, Footings.

2: Prepare working drawings RCC Water Tank.

3: Prepare working drawings steel braced column and grillage foundation.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J8144) CONSTRUCTION PLANNING AND PROJECT MANAGEMENT
**(Professional Elective – VI)**

**B.Tech IV-Year II-Semester- CIVIL**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1. To know the Concepts of construction planning and project management.
2. To learn project scheduling like PERT & CPM.
3. To study Objectives of construction management.
4. To study the Tendering process and Contract Management.
5. To understand Management information & control systems.

**UNIT – I**

**Introduction**: Historical background, planning for construction projects, steps involved in Planning objectives and principles of planning, Advantages, limitations and stages of planning, Bar charts and its limitations, Milestone charts, Work break down, Events and activities.

**UNIT – II**

**Networks**: Rules for networks, Numbering the events, PERT and CPM, Project duration, Calculation of floats, Time estimates, Calculation of slacks and probable completion time.

**Applications in Construction Engineering:** Cost Analysis and control: Direct cost, Indirect cost, Optimization of cost, Exercises in civil engineering projects, Cost control in construction project, Resource analysis- smoothening and leveling in various construction projects.

**UNIT – III**

**Construction management**: Introduction, Significance of construction management, Objectives and functions of construction management, Resources for construction industry, Construction team Major problems in construction industry, Functions and responsibilities of construction manager, Case studies, Future of construction management.

**UNIT – IV**

**Pre- Tendering and procurement**: Pre-tending process and stages, Pre-Qualification of bidders, Overview of Procurement Management, Basic Steps in Procurement Process, Public Procurement in India, E-Procurement, , Indian Contract Act 1872, Definition of Contract and its applicability.

**Construction contracts:** Understanding project contracts, Types of construction contracts, Standard conditions in construction contracts, Contractual documents, Conditions and specifications of contract.

**Contracts Performance Management:** Control and flexibility in contracts, Monitoring and controlling, Technical and operational performance of contracts, Controlling risks, Incentives and penalties, Change order management. **Contract Conditions:** Important contract clauses, Terms of payments, Retention, Acceptance and final payment, Time of completion, Extension of time, Maintenance period, Termination of contract and condition for termination.

**UNIT – V**

**Management information and control systems**: Management Information and Control Systems, Communication, System Concepts, Need for Management Information, Design of Management Information Systems, Computer Processing, Value of Information, Management Information Systems in Construction Industry.

**Decision making in construction industry**: Benefit cost analysis, replacement analysis, Break even analysis, Risk management in construction industry.

**Text Books :**

1. Moder, J.J., Phillips, C.R., and Davis, E.W, "Project Management with CPM and PERT and precedence diagramming", C.B.S. Publishers & Distributors, New Delhi.
2. Gajaria G.T., "Laws Relating to Building and Engineering Contracts in India", M. M. Tripathi Private Ltd.,Bombay, 1982 Tamilnadu PWD Code, 1986.
3. Brien. J.J., "CPM in Construction Management", McGraw Hill Book Company Inc., NY.

**References :**

1. S.Seetharaman, "Construction Engineering and Management", Umesh publication, New Delhi.
2. U.K.Srivastava, "Construction planning and Management" , Galgotia Publications Pvt Ltd,
3. V. K. Raina., "Construction and Contract Management" Shroff Publishers.
4. B. S Ramaswamy, "Contracts and their Management", LexisNexis India, 2008.

**Outcomes :**

On completion of this course, students will be able to

1. Explain the importance of Construction planning.
2. Do Project planning and its implementation.
3. Understand the Project Management.
4. Explain the pre-tendering stages and standard forms of contract& appraise the performance of contract and contract administration.
5. Understand construction project control processes and Management Information System.

# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J8145) INDUSTRIAL WASTE WATER TREATMENT
**(Professional Elective – VI)**

**B.Tech IV-Year II-Semester- CIVIL**

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|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1. To learn Pollution and its Effects.
2. To know different types of industrial wastes.
3. To study Pre and Primary treatment process.
4. To study Treatment plants.
5. To understand Maintenances of Treatment Plants.

**UNIT – I**

**Introduction:** Pollution, Sources of Pollution-Physical, Chemical, Organic and Biological Properties of Industrial wastes, Characteristics of Industrial and Municipal wastes, Differences between Industrial wastes and Municipal Wastes, Effects of Industrial wastes on Water bodies and Animals.

**UNIT – II**

**Industrial waste:** Characteristics and Composition of waste water and manufacturing processes of Industries like sugar mill, Dairy, Textile mill, Petroleum Refineries.

**UNIT – III**

**Pre and Primary Treatment:** Equalization, Proportioning, Neutralization, Oil Separation by Floating , Waste Reduction, Volume Reduction, Waste Treatment Methods, Nitrification and De-Nitrification, Phosphorous removal, Heavy metal removing, Membrane separation process, Disposal of Treated waste Water.

**UNIT – IV**

**Treatment Plant:** Joint Treatment Plant(JTP) of Raw Industrial waste water and Domestic Sewage, Common Effluent Treatment Plant(CETP), Location, Design, Operation.

**UNIT – V**

**Maintenance:** Maintenance, causes, Inspection, Cleaning of sewers, Flushing of sewers, maintaining the Treatment plant, Checking condition of Treatment plant, Sewer Repair.

**Text Books:**

1. W.wesley Eckenfelder, “Industrial Waste Water pollution Control” McGraw Hill.
2. Rao & Datta, “Industrial Treatment”.

**References :**

1. D. Lal & A. K. Upadhyay, “Water Supply and Waste Water Engineering” S. K .Kataria & Sons.

**Outcomes :**

On completion of this course, students will be able to

1. Know the methods to minimize the Pollution.
2. Know the Industrial Waste and its treatment.
3. Do the operating of Treatment Plant.
4. Reduce volume of waste water.
5. Know about Maintenance of Treatment plant.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J8146) SOLID AND HAZARDOUS WASTE MANAGEMENT
**(Professional Elective – VI)**

**B.Tech IV-Year II-Semester- CIVIL** **L T P C**

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**Objectives :**

This course will develop students' knowledge in/on

1: Soild waste and their handling process

2: Collection , Disposal of solid waste in landfills

3: Hazrdous soild waste management

4: Biomedical waste management

5: E-Waste Management.

**UNIT – I**

Solid waste and their handling: Definition of solid wastes- types of solid wastes-sources- Industrial, mining, agricultural and domestic- characteristics, solid waste problems- impact on environmental health.

**UNIT – II**

Collection, Segregation and transport and management of municipal solid wastes: Handling and segregation, Collection and storage of municipal solid wastes; analysis of collection systems. Transfer stations-labeling and handling of hazardous wastes. Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting-types, vermicomposting, termigradation, fermentation. Inclineration of solid wastes. Disposal in landfills: Site selections, design and operation of sanitary landfills; Leachate and landfill gas management; landfill remediation, regulatory aspects of municipal solid waste management.

**UNIT – III**

Hazardous waste and management: Hazardous waste definition, Physical and biological routes of transport of hazardous substance-sources and characterization. Sampling and analysis of hazardous wastes-proximate analysis-survey analysis-directed analysis, handling, collection, storage and transport. Hazardous waste treatment technologies TSDF concept- Chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste land fills-Site selections, design and operation. HW reduction, recycling and reuse, Regulatory aspects of HWM/HWM rules.

**UNIT – IV**

Biomedical waste management: Classification, collection, segregation treatment and disposal. Radioactive waste: Definition, low level and high level radioactive wastes and their management, radiation standards.

**UNIT – V**

E-Waste management: Waste characterstics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

**Text Books :**

1. Charles A. Wentz, " Hazardous waste Management", Tata McGrawhill International -1995.
2. Hilary Theisen and Sammuel A.Vigil, "Integrated solid waste management", George Tchobanolgious.

**Reference Books :**

1. Anjaneyulu, " Hazardous waste management".
2. " Criteria for hazardous waste landfills", CPCB Guidelines 2000.
3. Harry M Freeman, " Standard Handbook of Hazardous waste treatment and disposal", McGrawhill Co. 1997.

**Outcomes :**

After completion of this course, students will be able to….

1: Soild waste and their handling process.
2: Collection , Disposal of solid waste in landfills.
3: Hazrdous soild waste management.
4: Biomedical waste management.
5: E-Waste Management.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J8147) GROUND IMPROVEMENT TECHNIQUES
**(Professional Elective – VII)**

**B.Tech IV-Year II-Semester- CIVIL**

| L | T | P | C |
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**Objectives :**

This course will develop students' knowledge in/on

1. To Identify basic deficiencies of various soil deposits.
2. To understand position to decide various ways and means of improving the soil.
3. To learn the implementing techniques of improvement in Soil.
4. To study Compaction using Piles and Soil Stability.
5. To study chemical modification.

**UNIT - I**

**Introduction to Ground Modification**: Need and objectives, Identification of soil types, Selection of suitable ground improvement techniques based on soil condition In situ and laboratory tests to characterize problematic soils .Geotechnical problems in alluvial, laterite and black cotton soils - methods of ground improvement and their applications.

**UNIT - II**

**Mechanical Modification**: Deep Compaction Techniques- Blasting Vibro compaction, Dynamic Tamping and Compaction piles.

**UNIT -III**

**Hydraulic Modification**: Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering. Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains, Seepage analysis for two dimensional flow-fully and partially penetrating slots in homogenous deposits (Simple cases only).

**UNIT- IV**

**Physical and Chemical Modification:** Modification by admixtures, Shotcreting and Guniting Technology. Types of grouts - Grouting equipment and machinery - Injection methods - Grout monitoring – Stabilisation with cement, lime and chemicals - Stabilisation of expansive soils. Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

**UNIT -V**

**Modification by Inclusions and Confinement**: Soil reinforcement, - Applications of reinforced earth – reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing. Concept of reinforcement - Types of reinforcement material use of Geotextiles for filtration, drainage and separation in road and other works.

**Text Books :**

1. Koerner R.M., “Construction and Geotechnical Methods in Foundation Engineering”, McGraw-Hill.
2. Purushothama Raj, P. “Ground Improvement Techniques”, Tata McGraw-Hill Publishing Company, New Delhi.

**References :**

1. Koerner, R. M., “ Designing with Geosynthetics” , Prentice Hall, New Jersey.
2. Jones C. J. F. P. “ Earth Reinforcement and soil structures” ,Butterworths, London.
3. Xianthakos, Abreimson and Bruce – “Ground Control and Improvement”.
4. Hall, Glassgow.Jones J.E.P., “Earth Reinforcement and Soil Structure”, Butterworths.

**Outcomes :**

On completion of this course, students will be able to

1. Perform the deep compaction techniques.
2. Know the modification of admixtures.
3. Know the modification by soil reinforcement.
4. Know compaction of piles and soil stability. Know application of Chemical modification.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J8148) FINITE ELEMENT METHOD
**(Professional Elective – VII)**

**B.Tech IV-Year II-Semester- CIVIL**

| L | T | P | C |
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| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1. To know the basics of Finite Element theory and its advantages.
2. To learn different elements which are used in FEM.
3. To study one dimensional and two dimensional Problems in FEM.
4. To understand the static applications of FEM.
5. To understand the Dynamic applications of FEM.

**UNIT – I**

**Introduction to Finite Element Method:** Introduction to Finite Element Method – Basic Equations in Elasticity – Stress strain equations – concept of plane stress – plane strain – advantages and disadvantages of FEM**.**

**Element Properties:** Element shapes – nodes-nodal degree of freedom – strain displacement relation.

**UNIT – II**

**One Dimensional Analysis:** Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape function stiffness matrix**.**

**Beam Element:** FEA Beam elements – stress strain relation – shape functions – stiffness matrix – continuous beams.

**UNIT – III**

**Two Dimensional Analysis:** FEA Two dimensional problem – CST – LST element – shape function – stress strain relation.

**Other Elements:** Lagrangian – Serendipity elements – Hermite polynomials – regular, irregular 2 D & 3 D element – shape functions.

**UNIT – IV**

Isoparametric formulation – Concepts of isoparametric elements for 2D analysis – formulation of CST element, 4-noded and 8-noded iso-parametric quadrilateral elements.

**UNIT – V**

**Applications:**Plate Bending Problems - Finite Elements for Elastic Stability - Finite Elements in Fluid Mechanics- Dynamic Analysis.

**Text Books :**

1. David V. Hutton,"Fundamentals of Finite Element Analysis", Tata McGraw Hill.
2. Chandrupatla, T.R., and Belegundu, A.D., "Introduction to Finite Element in Engineering", Third Edition, Prentice Hall, India.

**References :**

1. Reddy J.N., "An Introduction to Finite Element Method", McGraw-Hill, Intl. Student Edition.
2. Krishnamoorthy C. S. ,"Finite Element Analysis Theory and Programming", Tata McGraw Hill Education.
3. Zienkiewics, "The finite element method, Basic formulation and linear problems", Vol.1, 4th Edition, McGraw-Hill, Book Co.
4. Rao S.S, "The Finite Element Method in Engineering", Pergaman Press.
5. Cook R. D.,"Concepts and Applications of Finite Element Analysis", Wiley and Sons.

**Outcomes :**

On completion of this course, students will be able to

1. Develop computer programming codes for different applications.
2. Know the applications of elements and their importance.
3. Solve one and two dimensional problems.
4. Do static applications of FEM.
5. Do Dynamic application of FEM.

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# JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
**(UGC-AUTONOMOUS)**

## (J8149) BRIDGE ENGINEERING
**(Professional Elective – VII)**

**B.Tech IV-Year II-Semester- CIVIL**

| L | T | P | C |
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| 3 | 0 | 0 | 3 |

**Objectives :**

This course will develop students' knowledge in/on

1: Basics of bridges and design loads.

2: Analyze and design Deck Slab and T Beam Bridge.

3: Plate girder and Truss bridge.

4: Design of bridge bearings, piers and abutments.

5: Bridge Inspection and Maintenance.

**UNIT – I**

**Fundamentals of Bridges:** Importance of bridges, Classification of bridges, Components, economic spans, Factors effecting types of bridge-natural and economic considerations, linear water ways and afflux.

**Design loads:** IRC standard loading, Impact factors, Wind loading, Seismic forces, longitudinal forces, Centrifugal forces, Buoyancy forces, Thermal forces, Erection stresses, Temperature effects, Standards for railway loading**.**

**Deck Slab Bridge:** Design of Reinforced Cement Concrete deck Slab Bridge, Analysis and design of Slab culvert as per IRC loading, Analysis and Design of Box Culvert.

**UNIT – II**

**T- Beam Bridges:**

General features, Introduction to Pegeard's Method , Design of interior panel slab, Courbon's method of analysis of longitudinal and cross girders.

**UNIT – III**

**Plate Girder Bridge:** Components of plate Girder Bridge, Design of plate girder bridge for railway loading.

**UNIT – IV**

**Steel Truss Bridge:** Types of Trusses, General and design features, Design of steel truss bridge as per IRC loading.

**UNIT – V**

**Bridge Bearings:** Types of bearing, forces on bearing, Design of elastomeric bearings, Types of expansion joints as per IRC:83-Part-I, and Part-II.

**Pier and Abutments:** Types of piers and abutments, Forces acting, Stability analysis and design.

**Text Books :**

1. N. Krishna Raju, “Design of Bridges”, Oxford and IBH Publishing Company Pvt. Ltd.
2. T.R. Jagadeesh and M.A. Jayaram “Design of Bridge Structures”, PHI Learning Pvt. Ltd, New Delhi.

**Reference Books :**

1. Victor DJ., “Essentials of Bridge Engineering” , Oxford and IBH Publishing Company Pvt. Ltd.
2. B.C. Punmia, “Design of Reinforced Concrete Strctures”, Vol. II, Laxmi Publishers, New Delhi.
3. VK Raina, “ Concrete Bridge Design & Practice”.
4. Ram Chandra, “Design of Steel Structures, Vol. II”, Standard book house, New Delhi.
5. IRC 5, 6 and 7, “Code of Practice for Design of Bridges”, Indian Road Congress, New Delhi.
6. IS: 800-1984: “Code of practice for steel construction”, Bureau of Indian Standards, New Delhi.
7. IS: 456-2000: “Code of practice for Plain and Reinforced Concrete”, Bureau of Indian Standards, New Delhi.

**Outcomes :**

After completion of this course, students will be able to….

1: Classify bridges and loads acting on them.
2: Design Deck slab and T-beam bridges.
3: Design Plate Girder Bridge and Steel Truss Bridge.
4: Design bridge bearings, piers and abutments.
5: Inspect the bridge and suggest the repair for Maintenance.

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