



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)

(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA)
Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510

BACHELOR OF TECHNOLOGY
CIVIL ENGINEERING

CHOICE BASED CREDIT SYSTEM (CBCS)
ACADEMIC REGULATIONS, COURSE STRUCTURE AND SYLLABI FOR
I, II, III AND IV YEARS
UNDER AUTONOMOUS STATUS FOR THE BATCHES ADMITTED FROM
THE ACADEMIC YEAR 2016 - 17

B.Tech. Regular Four Year Degree Programme
(For the batches admitted from the academic year 2016–17)
&
B.Tech. (Lateral Entry Scheme)
(For the batches admitted from the academic year 2017 - 18)

Note: The regulations here under are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already undergoing the program) as may be decided by the Academic Council.



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
ACADEMIC REGULATIONS 2016 (R16) FOR CHOICE BASED CREDIT SYSTEM (CBCS)
B.TECH. DEGREE COURSES
(Applicable for Students admitted from the academic year 2016-2017)

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- “Autonomous Institute / College” means an institute / college designated as autonomous institute / college by the UGC, New Delhi and JNTUH Statutes, 2014.
- “Academic Autonomy” means freedom to a College in all aspects of conducting its academic programs granted by the University for promoting excellence.
- “Commission” means University Grants Commission (UGC), New Delhi.
- “AICTE” means All India Council for Technical Education.
- “University” means the Jawaharlal Nehru Technological University, Hyderabad.
- “College” means SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY, Hyderabad unless indicated otherwise by the context.
- “Program” means: Bachelor of Technology (B.Tech) degree program
- “Branch” means specialization in a program like B.Tech degree program in Electronics and Communication Engineering, B.Tech degree program in Computer Science and Engineering etc
- “Course” or “Subject” means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester. For example, R14MTH1101: Mathematics - I, R14CSE1102 :Data Structures etc.
- T – Tutorial, P – Practical, D – Drawing, L - Theory, C – Credits



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY (An Autonomous Institution under UGC, New Delhi)

ACADEMIC REGULATIONS 2016 (R16) FOR CHOICE BASED CREDIT SYSTEM (CBCS) B.TECH. DEGREE COURSES

(Applicable for Students admitted from the academic year 2016-2017)

1 Courses of study

The following courses of study (Branches) are offered at present by the college for specialization for the B. Tech. Course:

Sl. No.	Branch Code	Branch
1	1	CIVIL ENGINEERING
2	2	ELECTRICAL & ELECTRONICS ENGINEERING
3	3	MECHANICAL ENGINEERING
4	4	ELECTRONICS & COMMUNICATION ENGINEERING
5	5	COMPUTER SCIENCE & ENGINEERING
6	12	INFORMATION TECHNOLOGY

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into First year of four year B.Tech. degree programmes shall be as mentioned below:

- The candidate shall be an Indian National.
- The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted
- Passed either Intermediate Public Examination (I.P.E) conducted by the Board of Intermediate Education, Andhra Pradesh, with Mathematics, Physics and Chemistry as optional subjects or any equivalent examination recognized by Board of Intermediate Education, Andhra Pradesh
- Seats in each programme in the Institution are classified into **Category A** and **Category B** as per the Government Orders (G.Os.)

1.1.1 Category – A Seats:

These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and State Government G.Os. as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os. Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

The Candidates shall be admitted into the Third semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET (FDH)) by the Convener, ECET

2. Credits

	Semester	
	Periods / week	Credits
Theory	03 / 04	03 / 04
Practical	03	02
Drawing	03 / 04	02 / 03
Mini Project	02	02
Comprehensive Viva Voce	--	02
Seminar	06	02
Main Project	15	09

Table : Compulsory subjects

Sl. No.	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project Work

3. Distribution and Weightage of Marks

- i. The performance of a student in each semester shall be evaluated subject –wise with **a maximum of 100 marks for theory and 75 marks for practical subjects**. In addition, an Industry oriented mini- project, Technical Seminar, Comprehensive viva-voce, and Main Project Work shall be evaluated for **50, 50, 100 and 200 marks** respectively.
- ii. For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End-Examination, Two mid examinations will be conducted in each semester as per the academic calendar. Each mid examination is evaluated for 25 marks. First mid examination should be conducted for 1 – 2 ½ Units of syllabus and the second mid examination shall be conducted for 2 ½ - 5 Units of syllabus. The mid descriptive type

exam paper consists of Section-A and Section-B.

Section-A [compulsory] consists of 5 short answer questions and each carries one mark.

Section-B consists of 6 questions out of which 4 are to be answered and each question carries 5 marks. The time duration of each mid examination is 90 minutes.

Two assignments are to be given to students covering the syllabus of first mid and second Mid examinations and these assignments and Attendance are evaluated for 5 marks each. The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.

At the end of the semester Internal Marks Maximum of 30 for the respective subjects are allotted as follows:

- a) 25 marks for the average of the two mid term examinations
- b) 5 marks of the average of the two assignment marks & Attendance

- **Award of final sessional marks** : Subject-wise attendance, average marks of two assignments and mid-examination marks will be added and rounded of to the next Integer.

- iii. For practical subjects there shall be a continuous evaluation during the semester for **25 sectional marks and 50 marks for end examination**. Out of the 25 marks for internal, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and 10 marks for internal examination (two internal practical examinations will be conducted and the average of the two examinations will be taken into account) and 5 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/examination and no makeup test/examination shall be conducted.

- iv. For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc., the distribution shall be **30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests** (the average of the two examinations will be taken into account) **and 70 marks for end examination**. There shall be **two internal tests** in a semester. The Internal and End Examination pattern for the above subjects may be different from the other theory subjects.
- v. There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year II Semester**. The industry oriented mini project shall be submitted in report form and should be presented before a

- committee, which shall be evaluated for **50 marks**. The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department and External Examiner.
- vi. There shall be a **seminar presentation in IV year II Semester**. For the seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consists of the Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for **50 marks**. There shall be **no external examination for seminar**.
- vii. There shall be a **Comprehensive Viva-Voce in IV year II semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated for **100 marks** by the Committee. There will be **no internal assessment for the Comprehensive viva-voce**.
- viii. The Project work shall be started by the student in the beginning of the IV year II Semester. Out of a total of **200 marks** for the project work, **50 marks shall be for Internal Evaluation** and **150 marks for the Semester end Examination**. The Semester end Examination (viva-voce) shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester. **The Internal Evaluation shall be on the basis of three seminars conducted during the IV year II semester for 20 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.**

4. Semester End Examination

(a) Theory Courses

Each course is evaluated for 70 marks. Examination is of 3 hours duration.

Question paper contains two sections [Section-A and Section-B]

Section-A : This Section Carries **20 marks** [Five short answer questions of four marks each and only one question to be set from any five units] **which is compulsory**.

Section-B: This Section carries 50 marks with 5 questions consisting of two parts each (a) and (b), out of which the student has to answer either (a) or (b), not both. Each question in Part B carries 10 marks.

(b) Practical Courses

Each lab course is evaluated for 50 marks. The examination shall be conducted by the laboratory teacher and another senior teacher

concerned with the subject of the same/other department/Industry. The external examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) **Supplementary Examinations**

Supplementary examinations will be conducted along with regular semester end examinations. (during even semester regular examinations, supplementary examinations of odd semester and during odd semester regular examinations, supplementary examinations of even semester will be conducted).

5. Attendance Requirements

- i. A student shall be eligible to appear for the Semester end examinations if he / she acquires a **minimum of 75% of attendance in aggregate of all the subjects** for that semester.
- ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and above and below 75%)** in a semester may be granted by **Institute Academic Committee**,
- iii. A student will not be permitted to write the end examination and hence not promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek re- admission for that semester when offered next. The student seeking re-admission for a semester will automatically forfeit all/any internal marks that he obtained in all the subjects of the present semester, as applicable.
- iv. Shortage of Attendance **below 65% in aggregate** shall in **NO case be condoned**.
- v. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that semester.
- vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

6. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.5.

- i.. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (25 out of 70 marks) 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**.
- ii. **Promotion Rules:**

Credits required for B.Tech. students to get Promotion from I to II year:

- A student will not be promoted from I year to II year unless he fulfills the academic requirement of 24 credits out of 48 credits of I year from all the examinations and secures prescribed minimum attendance.

Credits required for B.Tech. students to get Promotion from II to III year:

- A student will not be promoted from II year to III year unless he fulfills the academic requirement of 43 credits out of 72 credits up to II year I semester from all the relevant regular and supplementary examinations, whether he takes those examinations or not, and secures prescribed minimum attendance.

Credits required for B.Tech. students to get Promotion from III to IV year:

- A student will not be promoted from III year to IV year unless he fulfills the academic requirement of 72 credits out of 120 credits up to III year I semester from all the relevant regular and supplementary examinations, whether he takes those examinations or not, and secures prescribed minimum attendance.
- A student shall register and put up minimum attendance in all 192 credits and earn 192 credits. Grades obtained in the best 184 credits shall be considered for the calculation of CGPA.

7 Detained / Re-admitted Candidate

- i. A detained student can seek re-admission into a semester by giving a written application and enclosing the memorandum of marks of all exams he/she has appeared till that date.
- ii. Re-admission has to be effected within four weeks of the commencement of the semester. No application for re-admission will be accepted thereafter.
- iii. A comprehensive list of all detained candidates is to be maintained in the Examination Branch of the College. The cases of detained candidates have to be examined by a committee of all Heads of Departments to ascertain whether a candidate when readmitted has to undergo any new subject (Substitute Subject) in view of change of course structure. The necessary decisions have to be maintained in the Examination Branch well in advance of the commencement of classes so that the candidate can be informed as and when he or she seeks re-admission.

8. Course pattern

- i. The entire course of study is of four academic years. **All the I, II, III & IV years are of semester pattern .**
- ii. A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may reappear for that subject at the supplementary examination whenever conducted.
- iii. When a student is detained due to shortage of attendance in any semester, he/she may be re-admitted into that semester when it is offered next, **with the academic regulations of the batch into which he gets readmitted.**
- iv. When a student is detained due to lack of credits in any year, he/she may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he gets admitted**

9. Examinations and Assessment - The Grading System

For the award of grades in a course, all evaluation is done in marks as per the scheme of examination. **Marks so obtained are converted to grades at the end of semester as per the guidelines given below using Absolute Grading System.**

Award of Grade Using Absolute GRADING SYSTEM

Grade	GP	Marks
O (Out Standing)	10	≥ 90 - ≤ 100
A+	9	≥ 80 - < 90
A	8	≥ 70 - < 80
B+	7	≥ 60 - < 70
B	6	≥ 50 - < 60
C	5	≥ 45 - < 50
P	4	≥ 40 - < 45
F	0	< 40 - Fail
(Ab)	0	Absent

Semester Grade Point Average (SGPA)

The performance of a student in a semester is indicated by a number called **SGPA**. The **SGPA** is the weighted average of the grade points obtained in all the courses registered by the student during the semester.

$$SGPA = \frac{\sum C_i P_i}{\sum C_i}$$

where,

C_i = The number of credits for the i^{th} course of a semester for which SGPA is to be calculated.

P_i = Grade points earned in the i^{th} course.

$i_j = 1, 2, \dots, n$ represent the number of courses in which a student has registered in the concerned semester the SGPA is calculated to two decimal places.

Cumulative Grade Point Average (CGPA)

An up to date assessment of the overall performance of a student from the time of his first registration is obtained by calculating a number called CGPA, which is weighted average of the grade points obtained in all the courses registered by the student since he entered the institution.

$$CGPA = \frac{\sum C_j P_j}{\sum C_j}$$

where,

C_j = The number of credits for the j^{th} course up to the semester for which CGPA is to be calculated.

P_j = Grade points earned in the j^{th} course.

$i_j = 1, 2, \dots, n$ represent the number of courses in which a student has registered up to the semester for which the CGPA is to be calculated.

The CGPA is also calculated to two decimal places.

Note:

- As seen from above formula CGPA is **not average** of SGPA

10. Award of B.Tech. Degree and Class

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. Registered for **192 credits** and secured **192 credits.**

NOTE:

1. 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.
2. After securing the necessary 192 Credits as specified for the successful completion of the entire UGP, an exemption of 8 secured Credits (in terms of two of their corresponding Subjects/Courses) may be permitted for optional drop out from these 192 Credits earned; resulting in 184 Credits for UGP performance evaluation, i.e., the performance of the Student in these 184 Credits shall alone be taken into account for the calculation of 'the final CGPA (at the end of UGP, which takes the SGPA of the IV Year II Semester into account)', and shall be indicated in the Grade Card of IV Year II Semester; however, the Student's Performances in the earlier individual Semesters, with the corresponding SGPA and CGPA for which already Grade Cards are given, will not be altered. Further, optional drop out for such 8 secured Credits shall not be allowed for Subjects/ Courses listed as ... i) Laboratories/ Practicals, Industrial Training/ Mini-Project, iii) Seminar, iv) Major Project.
3. After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.Tech degree he / she shall be placed in one of the following four classes:

Class Awarded	CGPA to be secured
First Class with Distinction	≥ 7.75
First Class	$6.75 \leq \text{CGPA} < 7.75$
Second Class	$5.75 \leq \text{CGPA} < 6.75$
Pass Class	$5.0 \leq \text{CGPA} < 5.75$

11. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

12. Transitory Regulations

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

13. Minimum Instruction Days

The minimum instruction days for each semester shall be **90 clear instruction days**.

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

15. The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules concerned in view.

16. TERMINATION FROM THE PROGRAMME

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

- i. The student fails to satisfy the requirements of the program within the maximum period stipulated for that program.
- ii. The student fails to satisfy the norms of discipline specified by the institute from time to time.

17. CURRICULUM

- i. For each program being offered by the Institute, a Board of Studies (BOS) is constituted in accordance with AICTE / UGC / JNTUH statutes.
- ii. The BOS for a program is completely responsible for designing the curriculum once in three years for that program.

18. GRIEVANCES REDRESSAL COMMITTEE

“Grievances and Redressal Committee” (General) constituted by the principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters. The composition of the complaints cum redressal committee shall be:

Headed by Senior Faculty member

Heads of all departments

A senior lady staff member from each department (if available)

The committee constituted shall submit a report to the principal of the college, the penalty to be imposed. The Principal upon receipt of the report from the committee shall, after giving an opportunity of being heard to the person complained against, submit the case with the committee’s recommendation to the Governing Body of the college. The Governing Body shall confirm with or without modification the penalty recommended after duly following the prescribed procedure.

19. MALPRACTICE PREVENTION COMMITTEE

A malpractice prevention committee shall be constituted to examine and punish the students who does malpractice / behaves indisciplinately in examinations. The committee shall consist of:

Principal.

Subject expert of which the subject belongs to.

Head of the department of which the student belongs to.

The invigilator concerned.

In-charge Examination branch of the college.

The committee constituted shall conduct the meeting on the same day of examination or latest by next working day to the incidence and punish the student as per the guidelines prescribed by the JNTUH/SICET from time to time.

Any action on the part of candidate at the examination like trying to get undue advantage in the performance at examinations or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder. The involvement of the Staff, who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and recommended for award of appropriate punishment after thorough enquiry.

20. STUDENT'S FEEDBACK

It is necessary for the Colleges to obtain feedback from students on their course work and various academic activities conducted. For this purpose, suitable feedback forms shall be devised by the College and the feedback obtained from the students regularly in confidence, by administering the feedback form in print or on-line in electronic form.

The feedback received from the students shall be discussed at various levels of decision making at the College and the changes/ improvements, if any, suggested shall be given due consideration for implementation.

21 CONDUCT AND DISCIPLINE

- i. Each student shall conduct himself / herself in a manner befitting his / her association with SICET.
- ii. He / she is expected not to indulge in any activity, which is likely to bring disrepute to the college.
- iii. He / she should show due respect and courtesy to the teachers, administrators, officers and employees of the college and maintain cordial relationships with fellow students.
- iv. Lack of courtesy and decorum unbecoming of a student (both inside and outside the college), willful damage or removal of Institute's property or belongings of fellow students, disturbing others in their studies, adoption of unfair means during examinations, breach of rules and regulations of the Institute, noisy and unruly behaviour and similar other undesirable activities shall constitute violation of code of conduct for the student.
- v. **Ragging in any form is strictly prohibited and is considered a serious offence. It will lead to the expulsion of the offender from the college.**
- vi. Violation of code of conduct shall invite disciplinary action which may include punishment such as reprimand, disciplinary probation, debarring from the examination, withdrawal of placement services, withholding of grades / degrees, cancellation of registration, etc., and even expulsion from the college.

- vii. Principal, based on the reports of the warden of Institute hostel, can reprimand, impose fine or take any other suitable measures against an inmate who violates either the code of conduct or rules and regulations pertaining to college hostel.
- viii. A student may be denied the award of degree / certificate even though he / she has satisfactorily completed all the academic requirements if the student is found guilty of offences warranting such an action.
- ix. Attendance is not given to the student during the suspension period.

22. OTHER ISSUES

The quality and standard of engineering professionals are closely linked with the level of the technical education system. As it is now recognized that these features are essential to develop the intellectual skills and knowledge of these professionals for being able to contribute to the society through productive and satisfying careers as *innovators, decision makers and/or leaders* in the global economy of the 21st century, it becomes necessary that certain improvements are introduced at different stages of their education system. These include:

- a) Selective admission of students to a programme, so that merit and aptitude for the chosen technical branch or specialization are given due consideration.
- b) Faculty recruitment and orientation, so that qualified teachers trained in good teaching methods, technical leadership and student's motivation are available.
- c) Instructional/Laboratory facilities and related physical infrastructure, so that they are adequate and are at the contemporary level.
- d) Access to good library resources and Information & Communication Technology (ICT) facilities, to develop the student's *mind* effectively.

These requirements make it necessary for the College to introduce improvements like:

- a) Teaching-learning process on modern lines, to provide *Add-On Courses* for *audit/credit* in a number of peripheral areas useful for student's self development.
- b) Life-long learning opportunities for faculty, students and alumni, to facilitate their dynamic interaction with the society, industries and the world of work.
- c) Generous use of ICT and other modern technologies in everyday activities.

23. General

- i. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- ii. The academic regulations should be read as a whole for the purpose of any interpretation.
- iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
- iv. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.

- v. The College may change or amend any or all of the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students concerned with effect from the dates notified by the College.

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

(Applicable for students admitted from the academic year 2017-2018)

- i. A student shall register for all 144 credits and earn all the 136 credits. Marks obtained in all 136 credits shall be considered for the calculation of the class.
- ii. A student who fails to earn 144 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.
- iii. The same attendance regulations are adopted as that of B.Tech. Four year degree course.
- iv. **Credits required for B.Tech. students to get Promotion from II to III year:**
 - A student will not be promoted from II year to III year unless he fulfills the academic requirement of 24 credits out of 48 credits of II year from all the examinations and secures prescribed minimum attendance.

Credits required for B.Tech. students to get Promotion from III to IV year:

- A student will not be promoted from III year to IV year unless he fulfills the academic requirement of 43 credits out of 72 credits up to III year I semester from all the relevant regular and supplementary examinations, whether he takes those examinations or not, and secures prescribed minimum attendance.

- A student shall register and put up minimum attendance in all 144 credits and earn 144 credits. Grades obtained in the best 136 credits shall be considered for the calculation of CGPA.

v. **Award of B.Tech. Degree and Class:**

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 six academic years.
- ii. Registered for **144 credits** and secured **144 credits**.

NOTE:

1. Students, who fail to fulfill all the academic requirements for the award of the degree within six academic years from the year of their admission, shall forfeit their seat in B.Tech. course.
2. After securing the necessary 144 Credits as specified for the successful completion of the entire UGP, an exemption of 8 secured Credits (in terms of two of their corresponding Subjects/Courses) may be permitted for optional drop out from these 144 Credits earned; resulting in 136 Credits for UGP performance evaluation, i.e., the performance of the Student in these 136 Credits shall alone be taken into account for the calculation of 'the final CGPA (at the end of UGP, which takes the SGPA of the IV Year II Semester into

account)', and shall be indicated in the Grade Card of IV Year II Semester; however, the Student's Performances in the earlier individual Semesters, with the corresponding SGPA and CGPA for which already Grade Cards are given, will not be altered. Further, optional drop out for such 8 secured Credits shall not be allowed for Subjects/ Courses listed as ... i) Laboratories/ Practicals, Industrial Training/ Mini-Project, iii) Seminar, iv) Major Project.

3. After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.Tech degree he / she shall be placed in one of the following four classes:

Class Awarded	CGPA to be secured
First Class with Distinction	≥ 7.75
First Class	$6.75 \leq \text{CGPA} < 7.75$
Second Class	$5.75 \leq \text{CGPA} < 6.75$
Pass Class	$5.0 \leq \text{CGPA} < 5.75$

- vi. All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

MALPRACTICES RULES		
DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS		
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
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 work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the 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 performance in that subject and all the 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.

CIVIL ENGINEERING

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/Asst. – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	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 intentionally 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 the 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 firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits 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 the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.

CIVIL ENGINEERING

10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Note : Students are advised to read the above regulations thoroughly. Ignorance with regards to the regulations cannot be construed as an excuse.

Frequently asked Questions and Answers about autonomy

1. Who grants Autonomy? UGC, Govt., AICTE or University

In case of Colleges affiliated to a university and where statutes for grant of autonomy are ready, it is the respective University that finally grants autonomy.

2. Shall SICET award its own Degrees?

No. Degree will be awarded by Jawaharlal Nehru Technological University, Hyderabad with a mention of the name SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY on the Degree Certificate.

3. What is the difference between a Deemed University and an Autonomy College?

A Deemed University is fully autonomous to the extent of awarding its own Degree. A Deemed University is usually a Non-Affiliating version of a University and has similar responsibilities like any University. An Autonomous College enjoys Academic Autonomy alone. The University to which an autonomous college is affiliated will have checks on the performance of the autonomous college.

4. How will the Foreign Universities or other stake – holders know that we are an Autonomous College?

Autonomous status, once declared, shall be accepted by all the stake holders. Foreign Universities and Indian Industries will know our status through our college website.

5. What is the change of Status for Students and Teachers if we become Autonomous?

An autonomous college carries a prestigious image. Autonomy is actually earned out of continued past efforts on academic performances, capability of self-governance and the kind of quality education we offer.

6. Who will check whether the academic standard is maintained / improved after Autonomy? How will it be checked?

There is a built in mechanism in the autonomous working for this purpose. An Internal Committee called Academic Programme Evaluation Committee is a Non – Statutory body, which will keep a watch on the academics and keep its reports and recommendations every year. In addition to Academic Council, the highest academic body also supervises the academic matters. At the end of three years, there is an external inspection by the University for this purpose. The standards of our question papers, the regularity of academic calendar, attendance of students, speed and transparency of result declaration and such other parameters are involved in this process.

7. Will the students of SICET as an Autonomous College qualify for University Medals and Prizes for academic excellence?

No, SICET has instituted its own awards, medals, etc. for the academic performance of the students. However for all other events like sports, cultural and co-curricular organized by the University the students shall qualify.

8. Can SICET have its own Convocation?

No, since the University awards the Degree the Convocation will be that of the University.

9. Can SICET give a provisional degree certificate?

Since the examinations are conducted by SICET and the results are also declared by SICET, the college sends a list of successful candidates with their final percentage of marks to the University. Therefore with the prior permission of the University the college will be entitled to give the provisional certificate.

10. Will Academic Autonomy make a positive impact on the Placements or Employability?

Certainly. The number of students qualifying for placement interviews is expected to improve, due to rigorous and repetitive classroom teaching and continuous assessment, besides the autonomous status is more responsive to the needs of the industry. As a result, there will be a lot of scope for industry oriented skill development built-in into the system. The graduates from an autonomous college will therefore represent better employability.

11. What is the proportion of Internal and External Assessment as an Autonomous College?

Presently, it is 30% for internal assessment and 70% for external assessment. As the autonomy matures the internal assessment component shall be increased at the cost of external assessment.

12. Will there be any Revaluation or Re-Examination System?

No. There will not be any Revaluation system or Re-examination. But, there is a personal verification of the answer scripts.

13. How fast Syllabi can be and should be changed?

Autonomy allows us the freedom to change the syllabi as often as we need.

14. Will the Degree be awarded on the basis of only final year performance?

No. The percentage of marks will reflect the average performance of all the semesters put together.

15. Who takes Decisions on Academic matters?

The Academic Council of College is the top academic body and is responsible for all the academic decisions. Many decisions are also taken at the lower level like the BOS which are like Boards of Studies of the University.

16. What is the role of Examination committee?

The Exam Committee is responsible for the smooth conduct of inter and external examinations. All matters involving the conduct of examinations, spot valuations, tabulations, preparation of Memorandum of Marks etc fall within the duties of the Examination Committee.

17. Is there any mechanism for Grievance Redressal?

Yes, the college has grievance redressal committee, headed by a senior faculty member of the college.

18. How many attempts are permitted for obtaining a Degree?

All such matters are defined in Rules & Regulations.

19. Who declares the result?

The result declaration process is also defined. After tabulation work the entire result is reviewed by the Moderation Committee. Any unusual deviations or gross level discrepancies are deliberated and removed. The entire result is discussed in the College Academic Council for its approval. The result is then declared on the college notice boards as well put on the web site of the college. It is eventually sent to the University.

20. What is our relationship with the Jawaharlal Nehru Technological University, Hyderabad?

We remain an affiliated college of the Jawaharlal Nehru Technological University, Hyderabad. The University has the right to nominate its members on the academic bodies of the college.

21. Shall we require University approval if we want to start any New Courses?

Yes, It is expected that approvals or such other matters from an autonomous college will receive priority.

22. Shall we get autonomy for PG and Doctoral Programmes also?

Yes, presently our PG programmes are also enjoying autonomous status.

23. How many exams will be there as an autonomous college?

This is defined in the Rules & Regulations.

24. Is the College adapting Choice Based Credit System (CBCS) or Not ?

Yes, this College has adapted CBCS system with effect from the Academic Year 2016-17.

25. Note : What is Choice Based Credit System (CBCS)?

Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
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Choice Based Credit System (CBCS)

REGULATIONS – R16

**Common to All Non-Circuit Branches of B.Tech.
(MECH., CIVIL)**

I YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16MTH1101	Mathematics – I	4	0	4
R16EPH1101	Engineering Physics -1	3	1	3
R16CSE1101	Computer Programming	4	0	4
R16ECH1101	Engineering Chemistry	3	1	4
R16MED1102	Engineering Graphics –I	3	1	3
R16CSE1201	Computer Programming Lab	0	3	2
R16ECH1201	Engineering Chemistry Lab	0	3	2
R16EPH1201	Engineering Physics Lab	0	3	2
TOTAL		17	12	24

I YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16EPH1102	Engineering Physics -II	3	1	3
R16MED1101	Engineering Mechanics	4	0	4
R16HAS1101	English	4	0	4
R16CSE1102	Data Structures Through ‘C’	3	1	3
R16MED1103	Engineering Graphics – II	3	1	4
R16CSE1202	Data Structures Through ‘C’ Lab	0	3	2
R16MED1201	Workshop practice	0	3	2
R16HAS1201	English Language & Communication Skills Lab	0	3	2
TOTAL		17	12	24

* T/P/D: Tutorial/Practical/Drawing Practice

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Choice Based Credit System (CBCS)

REGULATIONS – R16

B. Tech. CIVIL ENGINEERING

II YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16MTH1102	Mathematics - II	3	1	3
R16EEE1131	Electrical & Electronics Engineering	3	1	3
R16CIV 1101	Strength of Materials – I	3	1	3
R16CIV 1102	Surveying	4	0	4
R16CIV 1103	Fluid Mechanics	4	0	4
R16HAS1103	Managerial Economics & Financial Analysis	3	1	3
R16CIV 1201	Surveying Lab – I	0	3	2
R16CIV 1202	Strength of Materials Lab	0	3	2
Total		20	10	24

II YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16MTH1105	Probability & Statistics	3	1	3
R16CIV 1104	Strength of Materials – II	3	1	3
R16CIV 1105	Hydraulics & Hydraulic Machinery	4	0	4
R16HAS1102	Environmental Studies	3	1	3
R16CIV 1106	Structural Analysis – I	3	1	3
R16CIV 1107	Building Materials, Construction & Planning	4	0	4
R16CIV 1203	Computer Aided Drafting of Buildings	0	3	2
R16CIV 1204	Surveying Lab – II	0	3	2
Total		20	10	24

* T/P/D: Tutorial/Practical/Drawing Practice

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Choice Based Credit System (CBCS)

REGULATIONS – R16

B. Tech. CIVIL ENGINEERING

III YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16CIV 1108	Concrete Technology	4	-	4
R16CIV1109	Reinforced Concrete Structures Design and Drawing	3	1	3
R16CIV 1110	Engineering Geology	3	1	3
R16CIV 1111	Geotechnical Engineering	3	1	3
R16CIV 1112	Water Resources Engineering – I	3	1	3
R16CIV1132	Open Elective Disaster Management	4	0	4
R16CIV1123	Intellectual Property Rights			
R16HAS1105	Human Values and Professional Ethics			
R16CIV 1205	Fluid Mechanics & Hydraulic Machines Lab	0	3	2
R16CIV 1206	Engineering Geology Lab	0	3	2
Total		20	10	24

III YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16CIV1116	Steel Structures Design and Drawing	3	2	4
R16CIV 1117	Environmental Engineering	3	1	3
R16CIV 1119	Transportation Engineering - I	3	1	3
R16CIV1122	Foundation Engineering	3	1	3
R16CIV1115	Structural Analysis -II	3	1	3
R16CIV1121	Elective -I Elements of Earthquake Engineering	4	0	4
R16CIV1134	Ground Improvement Techniques			
R16CIV1124	Ground Water Hydrology			
R16CIV1114	Environmental impact assessment			
R16CIV1139	Principles of Entrepreneurship			
R16CIV 1207	Geotechnical Engineering Lab	0	3	2
R16HAS1202	Advanced English Language Communication Skills Lab	0	3	2
Total		19	12	24

* T/P/D: Tutorial/Practical/Drawing Practice

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Choice Based Credit System (CBCS)

REGULATIONS – R16

B. Tech. CIVIL ENGINEERING

IV YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
R16CIV1128	Remote Sensing & GIS	3	1	3
R16CIV1120	Transportation Engineering -II	3	1	3
R16CIV1130	Estimating & Costing	3	1	3
R16CIV1118	Water Resources Engineering-II	3	1	3
R16MED1118	Elective-II Finite Element Methods	4	0	4
R16CIV1133	Advanced Foundation Engineering			
R16CIV1127	Watershed Management			
R16CIV1140	Air Pollution and Control			
R16CIV1125	Elective-III Advanced Structural Design	4	0	4
R16CIV1126	Earth and Rock fill Dams and Slope Stability			
R16CIV1131	Water Resources Systems Analysis			
R16CIV1113	Industrial Waste Water Treatment			
R16CIV 1208	Concrete & Highway Materials Lab	0	3	2
R16CIV 1209	Environmental Engineering Lab	0	3	2
Total		20	10	24

IV YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
	Elective-IV	3	1	3
R16CIV1138	Rehabilitation and Retrofitting of Structures	3	1	3
R16CIV1141	Geo-Environmental Engineering			
R16CIV1135	Design and Drawing of Irrigation Structures			
R16CIV1142	Solid Waste Management			
R16CIV1137	Prestressed Concrete Structures	3	1	3
R16CIV1143	Construction Management	3	1	3
R16CIV1210	Industry Oriented Mini project	0	0	2
R16CIV1211	Seminar	0	6	2
R16CIV1212	Project	0	15	9
R16CIV1213	Comprehensive Viva	0	0	2
Total		9	24	24

* T/P/D: Tutorial/Practical/Drawing Practice

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B.Tech. - I Year – I Semester

L	T/P/D	C
4	0	4

(R16MTH1101) Mathematics - I

UNIT - I Solution for linear systems

Matrices and Linear systems of equations: Elementary row transformations-Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- LU Decomposition- LU Decomposition from Gauss Elimination –Solution of Tridiagonal Systems-Solution of Linear Systems Eigen values, Eigen vectors – properties – Condition number of rank, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix. Calculation of powers of matrix – Modal and spectral matrices.

UNIT – II Linear Transformations

Real matrices – Symmetric, skew - symmetric, orthogonal matrices, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices – Eigen values and Eigen vectors of complex matrices and their properties. Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - Index - signature - Sylvester law, Singular value decomposition.

UNIT – III Basic definitions of Sequences and series – Convergences and divergence – Ratio test – Comparison test– Integral test – Cauchy’s root test – Raabe’s test – Absolute and conditional convergence - Functions of Single Variable- Rolle’s Theorem – Lagrange’s Mean Value Theorem – Cauchy’s Mean value Theorem – Generalized Mean Value theorem (all theorems without proof)

UNIT – IV Application of Single variables: Radius, Centre and Circle of Curvature – Evolutes and Envelopes. Tracing of curves in Cartesian and polar coordinates
Functions of several variables

Limits and continuity of functions of two variables- partial differentiation - total differential coefficient and chain rule - Jacobian- Functional dependence - Maxima and Minima of functions of two variables with constraints and without constraints- Lagrange’s method of multipliers.

UNIT – V Multiple integrals - double and triple integrals-scalar and vector fields- Gradient-Divergence- Curl and their related properties, Potential function - Laplacian and second order operators. Line integral – work done – Surface integrals - Flux of a vector valued function. Vector integrals theorems: Green’s -Stoke’s and Gauss’s Divergence Theorems (Statement & their Verification).

Text Books:

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
2. Mathematical Methods by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.

References:

1. Engineering Mathematics-I , Shahnaz Bathul, PHI learning.
2. Mathematical Methods by Shahnaz Bathul, PHI learning.

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B.Tech. - I Year – I Semester

L	T/P/D	C
3	1	3

(R16EPH1101) Engineering Physics – I

- UNIT – I**
- 1. Interference:** Superposition of waves, Young's double slit experiment, coherence, Newton's rings.
 - 2. Diffraction:** Fresnel and Fraunhofer diffractions, Fraunhofer diffraction at single slit and double slit, diffraction grating, Double refraction and Nicol prism.
- UNIT - II**
1. Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander Waals Bond, Calculation of Cohesive Energy of Diatomic Molecule
 - 2. Crystallography and Crystal Structures:** Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond Structures, Structures of NaCl, ZnS, CsCl.
- Unit III**
- 1. X-ray Diffraction:** Basic Principles, Bragg's Law, Laue Method, Powder Method, Applications of X-ray Diffraction.
 - 2. Defects in Crystals:** Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects; Estimation of Vacancies in Frenkel and Schottky Defects Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector, Surface Defects and Volume Defects.
- Unit IV**
- 1. Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle - Physical Significance of the Wave Function - Schrodinger's Time Independent Wave Equation - Particle in One Dimensional Potential Box extension to Three Dimensions.
 - 2. Elements of Statistical Mechanics:** Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Photon Gas, Black Body Radiation, Planck's Law.
- Unit V**
- 1. Free Electron Theory of Metals:** Classical free electron theory (Drude and Lorentz), Quantum Theory, Concept of Electron Gas, Fermi Energy, Density of Electrons state, Electrical conductivity of metals, relaxation time, collision time, mean free path
 - 2. Band Theory of Solids:** Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Quantitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron and Hole.

TEXT BOOKS

1. Applied Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.
2. Applied Physics T. Bhima Shankaram & G. Prasad (B.S. Publications)
3. Engineering Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.

REFERENCES

1. Applied Physics Mani Naidu Pearson Education
2. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co. Ltd
3. Introduction to Solid State Physics C. Kittel (Wiley Eastern).
4. Engineering Physics by T. Srikanth, K. Vijaya Kumar, S. Chandra Lingam, S. Chand & Co.Ltd.

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B.Tech. - I Year – I Semester

L	T/P/D	C
4	0	4

(R16CSE1101) Computer Programming

- UNIT - I** **Introduction to Computers** – Computer Systems - Computing Environments - Computer Languages –DOS/Linux Commands - System Development – SDLC - Creating and Running Programs;
Problem Solving Techniques – Flow Charts – Algorithms – Pseudo Code – Simple Illustrations - Domain Problems;
- UNIT – II** **C Fundamentals** – History of C Languages- Features of C- Structure of C- Reserved Words- Types - Identifiers – Constants - and Character set.;
Data Types – Basic Data Types- Derived Data Types- User Defined Data Types;
Basic Input Output- printf and scanf Functions- Format and Control Characters- Escape Sequences;
Expressions: Infix - Prefix – Postfix - Unary - Binary - Ternary;
Operators – Unary - Arithmetic- Relational- Logical – Bitwise - Assignment and Special Operators- Precedence and Associativity of Operators;
Statements – Syntax- Types of Statements- Evaluating Expressions- Type Conversions;
Branching – Conditional Branching - If - If-else – Nested If and Nested if else - Switch-Case - Control Structures (Loops) – While - Do-while - For - Dangling in Programming - Unconditional Branching - Break- Continue - Goto;
- UNIT – III** **Arrays** – Using Arrays in C – Two Dimensional Arrays- Multi-dimensional Arrays;
Pointers – Pointer Variable – Declaration – Definition – Initialization - Pointer to Pointers - Memory Mapping- Pointer Arithmetic- Arrays of Pointers – Dynamic Memory Allocation;
Strings – Basic Concepts on Strings - String Input/Output - Arrays of Strings - String Manipulation Functions;
- UNIT – IV** **Functions** – Function Definition- Function Declaration –Function Call – Parameters - Formal & Actual Parameters - Return Value - Scope of Parameters. Parameter Passing: Call by Value and Call by Reference - Passing Arrays as Function Arguments;
Recursion: Definition- Design – Limitations - Advantages and Disadvantages;
Macros – Pre-Processor Directives- Macro Creation- Conditional Compilation;
- UNIT – V** **Enumerated, Structure and Union Types** – Declaration – Initialization – Operations – Programming Applications - Nested Structures- Self Referential Structures- Structures as Function Arguments and Return Value - Differences Between Structures and Unions;
Files-Types of Files - File Pointer - File Opening Modes- Creating Files - Writing- Reading- Appending- Editing- Copying & Merge – Standard Library Functions - Random Accessing - Command Line Arguments - Error Handling;
- Text Books:** 1. “Computer Science- A Structured Programming Approach Using C” by B.A. Forouzan and R.F.Gilberg- Third Edition- Thomson.
2. “The C programming Language” by B.W.Kernighan- Dennis M.Ritchie- PHI Pearson Education.
- References:** 1. “Working with C” by Yashavant. P Kanetkar
2. “C how to program” by Paul Deitel and Havey Deitel- PHI
3. “Absolute beginner’s guide to C”- Greg M. Perry- Second Edition- Sams Pub

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B.Tech. - I Year – II Semester

L	T/P/D	C
3	1	4

Common to All Branches
(ECE, EEE, CSE, IT, MECH., CIVIL)

(R16ECH1101) Engineering Chemistry

- UNIT - I Electrochemistry and Batteries :** Concept of Electro Chemistry, Conductors (electronic & electrolytic), Conductance-Specific, Equivalent and molar conductance, Ionic conductance, ionic mobilities and their interrelation, EMF: Electrode, Electrode potential, standard electrode potential, Nernst equation and its applications, types of electrodes- Reference Electrodes (SCE, Quinhydrone electrode), Ion Selective Electrode (Glass Electrode), Galvanic Cells & Concentration Cells, Numerical problems. Batteries: Primary Cells (dry cell and Lithium cells), secondary cells (lead-Acid cell, Ni-Cd cell). Applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cells, methanol – oxygen fuel cell, Advantages and applications of fuel cells.
- Unit II Corrosion and its control :** Definition, causes and effects of corrosion, types of corrosion. Chemical and Electrochemical corrosion (mechanism), Factors affecting rate of corrosion - Purity of metal, position of metal in Galvanic series, nature of corrosion product, temperature, pH, and humidity. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – metallic coatings (anodic and cathodic), methods of application of metallic coatings- hot dipping, (galvanizing, tinning) cementation, cladding, electroplating (Copper Plating), Electroless Plating (Ni plating) - Organic surface coatings – paints its constituents and their functions.
- Unit III Polymers : Polymers** Definition, Classification, Types of Polymerization (Addition, Condensation & Coordination). Plastics: Thermoplastic resins & Thermo set resins, Compounding & fabrication of plastics (Compression and injection moulding), Preparation, properties, engineering applications of: PVC, PS, Teflon, & Bakelite, Fibres-Nylon - 6, 6 and terylene, Fiber Reinforced plastics (FRP) - Applications Rubbers – Natural rubber, vulcanization. Elastomers – Buna-S, Butyl rubber and Thiokol rubber. Conducting Polymers: Preparation, Mechanism of conduction and applications of Poly acetylene and poly aniline.
- Unit IV Water and Energy Sources :**
Water: Hardness of water, types of hardness, Causes of hardness, units. Numerical problems. Boiler feed water-internal treatment (Phosphate, Colloidal and Calgon conditioning), external treatment-Lime soda, Zeolite process & Ion exchange process and Numerical problems. Boiler troubles- scales & sludges, Priming and foaming, caustic embrittlement and boiler corrosion, Desalination of water-Reverse osmosis, potable water – treatment of water for domestic supply, disinfection by chlorination.

Energy sources: Fuels, Classification – Solid fuels – coal – analysis – proximate and ultimate analysis of coal, Liquid fuels – petroleum – refining of petroleum-cracking (thermal & catalytic), fixed bed catalytic cracking. Knocking (Octane and Cetane numbers) synthetic petrol –synthesis by Fischer Tropsch's process, Bergius Process; Gaseous fuels – Natural gas, CNG and LPG, Combustion – definition – HCV, LCV.

Unit V Surface and Materials Chemistry

Surface chemistry : Solid surfaces, types of adsorption, Langmuir adsorption isotherm, Calculation of surface area of solid & applications of adsorption, Colloids-classification of colloids, properties- Electrical (zeta potential) & optical (Tyndal effect) , applications of colloids.

Materials chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: classification, mechanism and properties of lubricant: Viscosity , Cloud point, pour point,flash & fire point,. Refractories: Classification, Characteristics of a good refractory.

TEXT BOOKS

1. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).
2. Text Book of Engineering Chemistry by Jyostna Cherukuri, Bharathi Kumari. VGS Publishers.
3. Text of Engineering Chemistry by S.S. Dara & Mukkanti S. Chand & Co, New Delhi(2006).

REFERENCES

1. Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
2. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning.
3. Applied Chemistry – A text for Engineering & Technology – Springer (2005).
4. Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (2008).

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B.Tech. - I Year – I Semester

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3	1	3

(R16MED1102) Engineering Graphics - I

- UNIT - I INTRODUCTION TO ENGINEERING DRAWING :** Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions. Curves used in Engineering Practice & their Constructions :
- a) Conic Sections including the Rectangular Hyperbola – General method only.
 - b) Cycloid, Epicycloid and Hypocycloid
 - c) Involute.
 - d) Scales: plain scales, diagonal and vernier scales
- Unit II DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE PROJECTION ONLY :** Principles of Orthographic Projections – Conventions – First and Third Angle Projections, Projections of Points and Lines inclined to both planes, True lengths, traces.
- Unit III PROJECTIONS OF PLANES & SOLIDS :** Projections of regular Planes inclined to one plane and both planes. Projections of Regular Solids inclined to both planes
Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone .
- Unit IV DEVELOPMENT OF SOLIDS:** Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts.\
- Unit V INTERPENETRATION OF SOLIDS:** Interpenetration of Right Regular Solids – Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

TEXT BOOK :

- 1. Engineering Drawing, N.D. Bhat / Charotar
- 2. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes
- 3. Engineering Drawing, Narayana and Kannaiah / Scietech publishers.

REFERENCES :

- 1. Engineering Drawing and Graphics, Venugopal / New age.
- 2. Engineering Drawing- Johle/Tata Macgraw Hill.
- 3. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.

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L	T/P/D	C
0	3	2

(R16CSE1201) Computer Programming Lab

Objectives:

- To learn/strengthen a programming language like C- To learn problem solving techniques Recommended Systems/Software Requirements:
- Intel based desktop PC- ANSI C Compiler with Supporting Editors- IDE's such as Turbo C- Bloodshed C-
- Linux with gcc compiler(GNU Compiler collection)

Week – 1 (basic programming- if- if-else- switch)

- Solving problems such as temperature conversion- student grading- income tax calculation- etc.- which expose students to use basic C operators.
- Write a C program to find the roots of a quadratic equation.
- Write a C program- which takes two integer operands and one operator form the user- performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Week – 2 (while- do looping)

- Write a C program to find the sum of individual digits of a positive integer.
- Write a C program to generate all the prime numbers between 1 and n- where n is a value supplied by the user.
- Write a program which checks a given integer is Fibonacci number or not.

Week – 3 (while- do looping)

- 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- Write a C function to read in two numbers- x and n- and then compute the sum of this geometric progression: $1+x+x^2+x^3+\dots+x^n$
- Write a C function to read in two numbers- x and n(no. of terms)- and then compute $\sin(x)$ and $\cos(x)$.

Week - 4 (For looping)

- Write a C program to generate Pascal's triangle.
- Write a C program to construct a pyramid of numbers.
- Write a C program to calculate the following Sum:

$$\text{Sum}=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$$
- The total distance travelled by vehicle in 't' seconds is given by distance = $ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

Week – 5 (Arrays)

- a) Write a C program to find both the largest and smallest number of an array of integers.
- b) Write a C program to find Addition of Two Matrices
- c) Write a C program for Calculating transpose of a matrix in-place manner.
- d) Write a C program to find Matrix multiplication by checking compatibility

Week – 6 (Strings)

- a) Simple programming examples to manipulate strings.
- b) Verifying a string for its palindrome property
- c) Write a C program that uses functions to perform the following operations:
 - i. To insert a sub-string in to given main string from a given position.
 - ii. To delete n Characters from a given position in a given string.
 - iii. To replace a character of string either from beginning or ending or at a specified location

Week – 7 (Pointers)

- a. Simple program to understand pointer concept
- b. Program which explains the use of dynamic arrays.
- c. Program to enlighten dangling memory problem (Creating a 2-D array dynamically using pointer to pointers approach.

Week – 8 (Structures)

- a) Examples which explores the use of structures- union and other user defined variables
- b) Write a C program that uses functions to perform the following operations using Structure:
 - i) Reading a complex number
 - ii) Writing a complex number
 - iii) Addition of two complex numbers
 - iv) Multiplication of two complex numbers

Week – 9 (Functions)

- a) Write a C function to generate Pascal's triangle.
- b) Write a C function to construct a pyramid of numbers.
- c) Write a C functions to find both the largest and smallest number of an array of integers.
- d) Write a Pointer based function to exchange value of two integers using passing by address.

Week - 10 (Recursive Functions)

- Write C programs that use both recursive and non-recursive functions for the following
- i) To find the factorial of a given integer.
 - ii) To find the GCD (Greatest Common Divisor) of two given integers.
 - iii) To solve Towers of Hanoi problem.

Week – 11 (Files)

- a) Write a C program which copies one file to another.
- b) Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line)

Week – 12 (Command Line arguments and macros)

- a) Copy source file contents into destination file by command line arguments
- b) Write a program to implement conditional compilation

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Common to All Branches
(ECE, EEE, CSE, IT, MECH., CIVIL)

(R16ECH1201) Engineering Chemistry Lab

1 Titrimetry:

- a. Estimation of hardness of water by EDTA method. (or)
- b. Estimation of calcium in limestone by Permanganometry.
- c. Estimation of Ferrous Ion by Permanganate
- d. Estimation of Ferrous Ion by $K_2Cr_2O_7$

Instrumental methods:

2 Colorimetry:

- a. Determination of ferrous iron in cement by colorimetric method. (or)
- b. Estimation of Copper by Colorimetric method.

3 Conductometry:

- a. Conductometric titration of strong acid Vs strong base. (or)
- b. Conductometric titration of mixture of acids Vs strong base.

4. Potentiometry:

- a. Titration of strong acid Vs strong base by potentiometry. (or)
- b. Titration of weak acid Vs strong base by potentiometry.

5. Physical Properties:

- a. Determination of viscosity of sample oil by redwood/oswald's viscometer
- b. Determination Surface Tension of lubricants

6. Identification and Preparations:

- a. Preparation of organic compounds Aspirin
- b. Benzimidazole

7. Mineral Analysis

- a. Determination of percentage of copper in brass. (or)
- b. Estimation of manganese dioxide in pyrolusite.

TEXT BOOKS

1. Practical Engineering Chemistry by K.Mukkanti, etal, B.S.Publishers, Hyd.

REFERENCES

1. Text Book of Engineering chemistry by R.N.Goyal and Harmendra Goel.
2. Instrumental Methods of Chemical Analysis, Chatwal Anand, Himalaya Publications.

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(R16EPH1201) Engineering Physics – 1 Lab

(Common for MECH, CIVIL)

- 1 Determination of wavelength of a given source of light by using diffraction grating.
- 2 To find the frequency of a tuning fork – Melde's Experiment.
- 3 To find the frequency of ac signal generator – A.C Sonometer.
- 4 Time constant of an RC – Circuit
- 5 LCR – Circuit
- 6 Newton Rings
- 7 Dispersive power of the material of a Prism – Spectrometer.
- 8 Stewart and Gee's Experiment
- 9 Torsional pendulum
- 10 Energy gap of a semi conductor.
- 11 Characteristics of a laser diode.
- 12 Numerical aperture of optical fiber
- 13 Bending loss of optical fiber

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B.Tech. - I Year – II Semester

L	T/P/D	C
3	1	3

(R16EPH1102) Engineering Physics - II

- UNIT I** Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect, Formation of PN Junction, PN Diode as a Rectifier (Forward and Reverse Bias).
- Unit II** Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities -Internal Fields in Solids, Clausius -Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.
- Unit III** Magnetic Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications Superconductivity, Meissner Effect, effect of Magnetic field, Type-1 and Type-II superconductors, Applications of Superconductors.
- Unit IV** 1. Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein s Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.
2.Fiber Optics: Principle of Optical Fiber, Construction of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Attenuation in Optical Fibers, Optical Fibers in Communication System, Application of Optical Fibers.
- Unit V** 1.Acoustics of Buildings & Acoustic Quieting: Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine s Formula for Reverberation Time(Quantitative Treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies. Acoustic Quieting.
2.Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour

TEXT BOOKS

1. Engineering Physics V. Rajaendra, TATA Mc. Graw Hill Publishers.
2. Applied Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.
3. Applied Physics T. Bhima Shankaram & G. Prasad (B.S. Publications)
4. Engineering Physics P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd.

REFERENCES

1. Applied Physics Mani Naidu Pearson Education
2. Engineering Physics by P. Appalaidu and Chandrasekhar VGS Booklinks.
3. Nanotechnology : A Gentle Introduction to the next Big Idea by M.Ratner, D. Ratner

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B.Tech. - I Year – II Semester

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4	0	4

(R16MED1101) Engineering Mechanics

- UNIT - I** Introduction to Engg. Mechanics – Basic Concepts.
Systems of Forces : Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.
- Unit II** **Equilibrium of Systems of Forces** : Free Body Diagram, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.
- Unit III** **Centroid** : Centroid of simple figures (from basic principles) – Centroid of Composite Figures
Centre of Gravity : Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, pappus theorem.
Area moment of Inertia : Definition – Polar Moment of Inertia, Transfer Theorem, Moment of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia : Moment of Inertia of Masses, Transfer Formula for Mass Moment of Inertia, mass moment of inertia of composite bodies.
- Unit IV** Analysis of perfect frames (Analytical Method) – Types of Frames – Assumptions for forces in members of a perfect frame, Method of joints, Method of sections, Force table,.
Kinematics : Rectilinear and Curvelinear motion – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.
Kinetics : Analysis as a Particle and Analysis of a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion.
- Unit V** **Work – Energy Method** : Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.
Mechanical Vibrations : Definitions, Concepts – Simple Harmonic Motion – Free vibrations, simple and Compound Pendulums and its Applications –

TEXT BOOK :

1. Engg. Mechanics / Irving. H. Shames Prentice – Hall.
2. Engg. Mechanics / S.S. Bhavikati & J.G. Rajasekharappa
3. Engg. Mechanics, Nelson

REFERENCES :

1. Engineering Mechanics / Fedinand . L. Singer / Harper – Collins.
2. Engg. Mechanics / Timoshenko & Young.
3. Engg. Mechanics Umesh Regl / Tayal.
4. Engg. Mechanics / R.V. Kulkarni & R.D. Askhevkar
5. Engg. Mechanics/Khurmi/S.Chand.
6. Engg. Mechanics / KL Kumar / Tata McGraw Hill.

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(COMMON TO ALL BRANCHES)

B.Tech. - I Year – I Semester	for Circuit Branches	L	T/P/D	C
B.Tech. - I Year – II Semester	for Non-Circuit Branches	4	0	4

(R16HAS1101) - ENGLISH

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

OBJECTIVES

To improve the language proficiency of the students in English with emphasis on LSRW skills.

To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.

To develop the study skills and communication skills in formal and informal situations.

LEARNING OUTCOMES

1. Usage of English Language, written and spoken
2. Enrichment of comprehension and fluency
3. Gaining confidence in using language in verbal situations

SYLLABUS

I. Listening Skills

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the skills based approach to language learning
2. To train students in listening so that they can comprehend the speech of people of different backgrounds and regions

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.

- Listening for general content

- Listening to fill up information
- Intensive listening
- Listening for specific information

II. 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
- Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe - Functional English for Success**)
 - Just A Minute(JAM) Sessions

III. Reading Skills

Objectives

1. To raise 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
- Skimming the text
 - Understanding the gist of an argument
 - Identifying the topic sentence
 - Inferring lexical and contextual meaning
 - Understanding discourse features
 - Scanning
 - Recognizing coherence/sequencing of sentences

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

IV. Writing Skills

Objectives

1. To raise 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
 - Use of appropriate vocabulary
 - Paragraph writing
 - Coherence and cohesiveness
 - Narration / description
 - Note Making
 - Formal and informal letter writing
 - Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Five Units**, are prescribed:

For Detailed study: First Textbook: “Skills Annexe -Functional English for Success”, Published by Orient Black Swan, Hyderabad

For Non-detailed study

1. Second text book “Epitome of Wisdom”, Published by Maruthi Publications, Guntur

The course content and study material is divided into **Five Units**.

Unit –I

1. Chapter entitled ‘**Wit and Humour**’ from ‘**Skills Annexe**’ -Functional English for **Success**, Published by Orient Black Swan, Hyderabad

2. Chapter entitled ‘**Mokshagundam Visvesvaraya**’ from “**Epitome of Wisdom**”, Published by Maruthi Publications, Hyderabad

L-Listening For Sounds, Stress and Intonation

S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)

R- Reading for Subject/ Theme

W- Writing Paragraphs

G-Types of Nouns and Pronouns

V- Homonyms, homophones, synonyms and antonyms

Unit –II

1. Chapter entitled “**Cyber Age**” from “**Skills Annexe -Functional English for Success**” Published by Orient Black Swan, Hyderabad

2. Chapter entitled ‘**Three Days To See**’ from “**Epitome of Wisdom**”, Published by Maruthi Publications, Hyderabad

L – Listening for themes and facts

S – Apologizing, interrupting, requesting and making polite conversation

R- for theme and gist

W- Describing people, places, objects and events

G- Verb forms

V- noun, verb, adjective and adverb

Unit –III

1. Chapter entitled ‘**Risk Management**’ from “**Skills Annexe -Functional English for Success**” Published by Orient Black Swan, Hyderabad

2. Chapter entitled ‘**Leela’s Friend**’ by R.K. Narayan from “**Epitome of Wisdom**”, Published by Maruthi Publications, Hyderabad

L – for main points and sub-points for note taking

S – giving instructions and directions; Speaking of hypothetical situations

R – reading for details

W – note-making, information transfer, punctuation

G – present tense

V – synonyms and antonyms

Unit –IV

1. Chapter entitled '**Human Values and Professional Ethics**' from "**Skills Annexe - Functional English for Success**" Published by Orient Black Swan, Hyderabad
2. Chapter entitled '**The Last Leaf**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad

L -Listening for specific details and information

S- narrating, expressing opinions and telephone interactions

R -Reading for specific details and information

W- Writing formal letters and CVs

G- Past and future tenses

V- Vocabulary - idioms and Phrasal verbs

Unit –V

1. Chapter entitled '**Sports and Health**' from "**Skills Annexe -Functional English for Success**" Published by Orient Black Swan, Hyderabad
2. Chapter entitled '**The Convocation Speech**' by N.R. Narayanmurthy' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad

L- Critical Listening and Listening for speaker's tone/ attitude

S- Group discussion and Making

presentations

R- Critical reading, reading for reference

W-Project proposals; Technical reports, Project Reports and Research Papers

G- Adjectives, prepositions and concord

V- Collocations and Technical vocabulary Using words appropriately

* Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

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(R16CSE1102) Data Structures Through ‘C’

- UNIT - I** **Data Structures** – Introduction to Data Structures- Classification of Data Structures - Abstract Data Types
Stacks - Operations of Stack- Push - Pop- Display - Necessary Conditions on Stack - Array Representation - Stack Implementations – Stack implementation of Recursion - Stack Applications – Stack Application of Expression Conversion and Expression Evaluation;
- UNIT - II** **Queues**-Operations of Queue- Insert- Remove - Display - Necessary Conditions on Queues - Array Representation - Types of Queues: Circular Queue- D-Queues- Operations- Implementation and Applications – Queue Application of Scheduling Algorithms – First-In-First-Out Scheduling Algorithm - Round-Robin Scheduling Algorithm
- UNIT – III** **Linked list** – Disadvantages of Linear List and Advantages of Linked List- Singly Linked List -Operations of Linked List - Insertion- Deletion - Display – Searching - Types of Lists - Circular Linked List - Double Linked List – Operations- Implementation and Applications - Linked Representation of Stacks – Linked Representation of Queues;
- UNIT – IV** **Trees** – Definition- Terminology- Tree Types. Binary Tree- Definition- Representation- Binary Search Tree - Binary Tree Traversals - In Order - Pre Order – Post Order Tree Traversal Techniques;
Graphs – Definitions- Graph Representations- Graph Traversals - BFS and DFS;
- UNIT - V** **Searching** - Linear and Binary Search Methods;
Sorting - Bubble Sort - Selection Sort - Insertion Sort - Radix Sort - Quick Sort - Merge sort;
Complexity – Complexity of Searching and Sorting Techniques - Big O Notation- Comparison of Sorting Techniques;

Text Books

1. “Data Structures through C” by Yashavant. P Kanetkar, BPB
2. “Data Structures Using C” by Aaron M. Tenenbaum, Pearson Education

References :

1. “C& Data structures” by P. Padmanabham- Third Edition- B.S. Publications.
2. “Data Structures using C” by A.M.Tanenbaum- Y.Langsam- and M.J. Augenstein- Pearson-Education / PHI
3. “C Programming & Data Structures” by E. Balagurusamy, TMH.
4. “C Programming & Data Structures” by P. Dey- M Ghosh R Thereja, Oxford University Press
5. “C& Data structures”by E V Prasad and N B Venkateswarlu, S. Chand&Co.

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3	1	4

(R16MED1103) Engineering Graphics - II

UNIT - I ISOMETRIC PORJECTIONS :

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.

Unit II TRANSFORMATION OF PROJECTIONS :

Conversion of Isometric Views to Orthographic Views –Conventions.

Unit III PERSPECTIVE PROJECTIONS :

Perspective View : Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods(General Method only).

Unit IV Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs and methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.

Unit V Introduction to Computer aided Drafting:

Generation of points, lines, curves, polygons, simple solids, dimensioning.

TEXT BOOK :

4. Engineering Drawing, N.D. Bhat / Charotar
5. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes
6. Engineering Drawing, Narayana and Kannaiah / Scietech publishers.

REFERENCES :

4. Engineering Drawing and Graphics, Venugopal / New age.
5. Engineering Drawing- Johle/Tata Macgraw Hill.
6. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.

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B.Tech. - I Year – I Semester

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(R16MED1201) WORKSHOP PRACTICE

Part – A (IT Workshop)

- Week - 1** *Introduction to Computers:* Identify the Peripherals of Computer - Components in CPU Assembling and Disassembling - Hardware trouble shooting;
- Week - 2** *Software Installation:* Introduction to Operating System- Installation of DOS- Windows and Unix/Linux Installation - Configuring and Trouble Shooting;
- Week - 3** *Drivers and Utilities:* Threats- Virus- Worms - anti, Virus- Firewall and Device Driver's Configuration;
Office Automation: Introduction- Need of Automation- Windowing- Toolbars- Menu Application;
- Week – 4** *Word Processing:* Formatting Styles - Applying Text Effects - Paragraphs- Borders- Backgrounds - Header and Footer - Tables – Images - Hyper linking – Mail Merge;
- Week - 5** *Spreadsheets:* Creating Tabulated Information - Overview of Toolbars - Formatting Cells - Creation of Graphs and Charts - Learning Functions and Formulas;
- Week - 6** *Presentations:* Orientation and Layouts of Presentation - Types of Views - Inserting Styles - Design and Custom Animation - Setup and Slide Show;
- Week - 7** *Browsing:* Introduction to Internet- LAN- Connecting Computers through LAN- Accessing Computers through LAN - Access to Websites and Emails - Search Engines like Google and MSN.

REFERENCES:

- 1) "Building a Dream PC" by Will Smith- Que Publications.
- 2) "Upgrading and Repairing PCs" 12th Edition- Scott Mueller- Que Publications
- 3) "Repairing and Upgrading your PC" by Robert Bruce Thompson; Barbara Fritchman Thompson- O'Reilly.
- 4) "Microsoft Office for the Older and Wiser: Get Up and Running with Office 2010 and Office 2007" by Sean McManus.
- 5) "The Essential Guide to Computing: The Story of Information Technology (Essential Guide Series)" by E. Garrison Walters-

Part – B (Engineering Workshop)

Trades for Exercises : At least two exercises from each trade

- Week - 1** Carpentry
- Week - 2** Fitting
- Week - 3** Tin-smithy and Black-Smithy
- Week - 4** House Wiring
- Week - 5** Foundry
- Week - 6** Welding
- Week - 7** Plumbing & Machine Shop

Text Books :

1. Work shop Manual – P. Kannaiah / K.L. Narayana, Scitech Publishers
2. Work shop Manual by Venkatreddy
3. Work shop practice by Hazra Chowdary

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(COMMON TO ALL BRANCHES)

B.Tech. - I Year – I Semester	for Circuit Branches	L	T/P/D	C
B.Tech. - I Year – II Semester	for Non-Circuit Branches	0	3	2

(R16HAS1201) ENGLISH LANGUAGE & COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives

- ✎ To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- ✎ To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✎ To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- ✎ To improve the fluency in spoken English and neutralize mother tongue influence
- ✎ To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus: English Language Communication Skills Lab shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab**
- b. Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

Exercise – I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab: Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

Exercise - III

CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV

CALL Lab: Intonation and Common errors in Pronunciation.

ICS Lab: Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
 - a) Speed – 2.8 GHZ
 - b) RAM – 512 MB Minimum
 - c) Hard Disk – 80 GB
- ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories*. New Delhi: Foundation
2. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews*. Tata McGraw Hill
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate*. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced*. Cambridge: CUP
7. Marks, J. 2009. *English Pronunciation in Use. Elementary*. Cambridge: CUP
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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(R16MTH1102) Mathematics – II

Objectives:

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- The aim to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The aim at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

UNIT – I

Vector Calculus: Vector Calculus: Scalar point function and vector point function, Gradient-Divergence- Curl and their related properties. Solenoidal and irrotational vectors – finding the Potential function. Laplacian operator. Line integral – work done – Surface integrals -Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

UNIT – II:

Fourier series and Fourier Transforms: Definition of periodic function. Fourier expansion of periodic functions in a given interval of length $2p$. Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – III:

Interpolation and Curve fitting

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences Backward differences –Central differences – Symbolic relations of symbols. Difference expressions – Differences of a polynomial-Newton's formulae for interpolation - Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – IV : Numerical techniques

Solution of Algebraic and Transcendental Equations and Linear system of equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method). Jacobi's and Gauss-Seidel iteration methods.

UNIT – V

Numerical Integration and Numerical solutions of differential equations:

Numerical integration - Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8$ Rule , Gauss-Legendre one point, two point and three point formulas.

Numerical solution of Ordinary Differential equations: Picard's Method of successive approximations. Solution by Taylor's series method – Single step methods-Euler's Method-Euler's modified method, Runge-Kutta (second and classical fourth order) Methods.

Boundary values & Eigen value problems: Shooting method, Finite difference method and solving eigen values problems, power method

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons. 2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
4. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, 2013, CRC Press Taylor & Francis Group.
5. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC
6. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Person Education
- 7 Mathematics For Engineers By K.B.Datta And M.A S.Srinivas, Cengage Publications

Outcomes: From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.
- After studying this unit, one will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.

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B.Tech. - II Year – I Semester

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(R16EEE1131) ELECTRICAL AND ELECTRONICS ENGINEERING

Objective:

This course introduces the concepts of electrical DC and AC circuits, basic law's of electricity, instruments to measure the electrical quantities, different methods to solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers. It also emphasis on basics of electronics, semiconductor devices and their characteristics and operational features.

UNIT-I:

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchoff's Laws, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations. **Instruments:** Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT-II:

DC Machines: Principle of operation of DC Generator – EMF equation - types – DC motor types – torque equation – applications – three point starter.

UNIT-III:

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

AC Machines: Principle of operation of alternators – regulation by synchronous impedance method –Principle of operation of induction motor – slip – torque characteristics – applications.

UNIT-IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode Applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

UNIT-V:

Cathode Ray Oscillos Scope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

EEE: TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

EEE: REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarthy, Sudipta nath, Chandrakumar Chanda, Tata-McGrawHill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

ECE: TEXT BOOKS:

1. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,Tata McGraw-Hill companies..
2. Electronic Devices and Circuits, K. Lal Kishore,BS Publications.

ECE: REFERENCE BOOKS:

1. Millman's Electronic Devices and Circuits,J. Millman, C.C.Halkias, and Satyabrata Jit, Tata McGraw- Hill companies.
2. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky,PEI/PHI.
3. Introduction to Electronic Devices and Circuits, Rober T. Paynter,PE.
4. Integrated Electronics, J. Millman and Christos C. Halkias, Tata McGraw-Hill companies.
5. Electronic Devices and Circuits, Anil K. Maini, Varsha Agarwal,Wiley India Pvt. Ltd.

Outcome:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc...and different semiconductor devices, their voltage -current characteristics, operation of diodes, transistors, realization of various electronic circuits with the various semiconductor devices, and cathode ray oscilloscope, With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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B.Tech. - II Year – I Semester

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3 /-1/- 3

(R16CIV1101) STRENGTH OF MATERIALS - I

UNIT – I

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

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

UNIT – II

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

UNIT – III

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

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

UNIT – IV

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

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

UNIT – V

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

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TEXT BOOKS:

- 1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
- 2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
- 3) Mechanics of Materials by Pytel, Cengage Learning Pvt. Ltd. .

REFERENCES:

- 1) Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.
- 2) Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.
- 3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
- 4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
- 5) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd
- 6) Strength of Materials and Structures by John Case et al., Butterworth-Heinemann.
- 7) Strength of Materials by R.Subramanian, Oxford University Press.

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4	/-/-	4

(R16CIV1102) SURVEYING

UNIT – I

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

Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT – II

Leveling and Contouring: Concept and Terminology, Temporary adjustments- method of leveling. Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT – III

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT -IV

Theodolite: Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing.

UNIT – V

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position. **Curves:** Types of curves, design and setting out – simple and compound curves. **Introduction to Advanced Surveying :** Total Station and Global positioning system, Introduction to Geographic information system (GIS).

TEXT BOOKS:

1. Chandra A M, “Plane Surveying” and “Higher Surveying” New age International Pvt. Ltd., Publishers, New Delhi, 2002
2. Duggal S K, “Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.
3. Text book of surveying by C.Venkataramaiah, Unversitiies Press

REFERENCES:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press – 2012
2. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill
3. Arthur R Benton and Philip J Taety, Elements of Plane Surying, McGraw Hill – 2000
4. “Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N. Madhu.

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B.Tech. - II Year – I Semester

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4 /-/- 4

(R16CIV1103) FLUID MECHANICS

UNIT I

Introduction : Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal’s law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

Hydrostatic Forces : Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II

Fluid Kinematics : Description of fluid flow, Stream line, path line 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, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT –III

Fluid Dynamics: Surface and body forces – Euler’s and Bernoulli’s equations for flow along a stream line for 3 -D flow, (Navier – stokes equations (Explanatory) Momentum equation and its 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

Boundary Layer Theory : Approximate Solutions of Navier Stoke’s Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no deviation), BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

UNIT –V

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

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Mechanics of Fluids by Potter, Cengage Learning Pvt. Ltd.

REFERENCES:

1. Fluid Mechanics Basic Concepts & Principles, Shiv Kumar, Ane Books Pvt Ltd.
2. Fluid Mechanics and Machinery, CSP Ojha, Oxford Higher Education
3. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
4. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
5. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi.
6. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.

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3 /1/-/ 3

(R16HAS1103) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

Objectives:

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance-Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha : MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods and pricing in different market structures.
- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

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B.Tech. - II Year – I Semester

L T/P/D C
- /-3/- 2

(R16CIV1201) SURVEYING LAB – I

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 methods 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
10. Two exercises on contouring.

LIST OF MAJOR EQUIPMENT:

1. Chains, tapes, Ranging rods, cross staff, arrows
2. Compasses and Tripods, Optical square.
3. Plane tables, Alidade, Plumbing fork, trough compasses
4. Leveling instruments and leveling staves
5. Box sextants, planimeter.

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B.Tech. - II Year – I Semester

L T/P/D C
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(R16CIV1202) STRENGTH OF MATERIALS LAB

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

LIST OF MAJOR EQUIPMENT:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

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B.Tech. - II Year – II Semester

L	T/P/D	C
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(R16MTH1105) PROBABILITY & STATISTICS

Objectives: To learn

- Understand a random variable that describe randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates.
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix(transition probability matrix), Limiting probabilities, Applications of Markov chains

UNIT - I

Single Random variables and probability distributions: Random variables - Discrete and continuous. Probability distributions, mass function/ density function of probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

UNIT - II

Multiple Random variables, Correlation & Regression: Joint probability distributions- Joint probability mass/ density function, Marginal probability mass / density functions. Covariance of two random variables, Correlation Coefficient of correlation, The rank correlation. Regression-Regression Coefficient, The lines of regression and multiple correlation & regression.

UNIT - III

Sampling Distributions and Testing of Hypothesis: Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of mean and sampling distribution of variance.

Parameter estimations - likelihood estimate, interval estimations.

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors - critical region, confidence interval, Level of significance, Once sided test, Two sided test,

Large sample tests:

- Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)

- ii. Tests of significance of difference between sample S.D and population S.D.
- iii. Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples Snedecor's F-distribution and its properties. Test of equality of two population variances. Chi-square distribution, its properties, Chi-square test of goodness of fit

UNIT - IV

Queuing Theory: Structure of a queuing system, Operating characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue.

UNIT - V

Stochastic processes: Introduction to Stochastic Processes - Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states - Examples of Markov Chains, Stochastic Matrix.

TEXT BOOKS:

1. Higher Engineering Mathematics by Dr. B.S Grewal, Khanna Publishers
2. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press
3. Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B.Datta and M.S.Sriniva, Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I.Devore.

Outcomes:

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuits as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations. It is Mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in industry. It is useful for all branches of engineering.
- The student would be able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in n^{th} state. It is quite useful for all branches of engineering.

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(R16CIV 1104) STRENGTH OF MATERIALS – II

UNIT - I

Torsion of Circular Shafts: Theory of pure torsion - Derivation of Torsion equations : $T/J = q/r - N \theta/L$ - Assumptions made in the theory of pure torsion - Torsional moment of resistance - Polar section modulus - Power transmitted by shafts - Combined bending and torsion and end thrust - Design of shafts according to theories of failure.

Springs: Introduction - Types of springs - deflection of close and open coiled helical springs under axial pull and axial couple - springs in series and parallel - Carriage or leaf springs.

UNIT - II

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

Beams Curved in Plan: Introduction - circular beams loaded uniformly and supported on symmetrically placed Columns - Semi-circular beam simply-supported on three equally spaced supports.

UNIT - III

Beam Columns: Laterally loaded struts - subjected to uniformly distributed and concentrated loads - Maximum B.M. and stress due to transverse and lateral loading.

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

UNIT - IV

Unsymmetrical Bending: Introduction - Centroidal principal axes of section - Graphical method for locating principal axes - Moments of inertia referred to any set of rectangular axes - Stresses in beams subject to unsymmetrical bending - Principal axes - Resolution of bending moment into two rectangular axes through the centroid - Location of neutral axis - Deflection of beams under unsymmetrical bending.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical(channel, I, T and L) sections

UNIT - V

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

Thick Cylinders: Introduction Lamé's theory for thick cylinders -Derivation of Lamé'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. Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
2. Strength of Materials by R.K.Rajput, S.Chand & Company Ltd.
3. Mechanics of Materials by Gere, Cengage Learning Pvt. Ltd.

REFERENCES:

1. Fundamentals to Solid Mechanics by M.L.Gambhir, PHI Learning Pvt. Ltd.
2. Introduction to Strength of Material by U.C.Jindal, Galgotia Publications Pvt. Ltd.
3. Strength of Materials by Bhattacharya, Cengage Learning
4. Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
5. Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
6. Strength of Materials by R.Subramanian, Oxford University Press.
7. Mechanics of Materials by Ferdinand P.Beer et al., Tata McGraw Hill Education Pvt. Ltd.

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(R16CIV1105) HYDRAULICS & HYDRAULIC MACHINERY

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

Dimensional Analysis and Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models - Geometric, kinematic and dynamic similarities-dimensionless numbers - model and prototype relations.

UNIT - III

Hydrodynamic Force on Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency Angular momentum principle, Applications to radial flow turbines. Layout of a typical Hydropower installation - Heads and efficiencies.

UNIT - IV

Hydraulic Turbines: Classification 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-Pumps: Pump installation details-classification-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.

TEXT BOOKS:

1. Open Channel flow by K.Subramanya. Tata Mc.Graw Hill Publishers.
2. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
3. Fluid Mechanics & Fluid machines by Narayana pillai, Universities press.

REFERENCES:

1. Fluid Mechanics and Machinery, CSP OJHA, Oxford University Press
2. Elements of Open channel flow by Ranga Raju, Tata McGraw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand & Co.
4. Open Channel flow by V.T.Chow, McGraw Hill book company.
5. Fluid Mechanics and Machinery by D.Ramdurgaia New Age Publications.
6. Mechanics of Fluids by Merle C.Potter, David C.Wiggert, Bassem H.Ramadan, Cengage Learning.

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3	/-1/-	3

(R16HAS1102) ENVIRONMENTAL STUDIES

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

Ecosystems : Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, devices and carrying capacity, Field visits.

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 problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, case studies.

UNIT - III

Biodiversity and its conservation : Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . 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 Exist conservation. National biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary. Overview of air pollution control technology, Concept of bioremediation. Global Environmental Problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montreal Protocol.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and

Socio - economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan(EMP). Towards Sustainable Future: Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl Human Health, Environmental Ethics, Concept of Green Building, Ecological foot print, Life Cycle Assessment(LCA), Low carbon life style.

TEXT BOOK:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE:

1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela . 2008 PHI Learning Pvt Ltd.
4. Environmental Science by Daniel B. Botkin & Edwards A. Keller, Wiley INDIA edition.
5. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

Outcomes:

Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which intern helps in sustainable development.

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B.Tech. - II Year – II Semester

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3	/-1/-	3

(R16CIV 1106) STRUCTURAL ANALYSIS – I

UNIT - I

Analysis of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames. Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT - II

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due axial load, bending moment and shear forces- castigliano's first theorem - Unit Load Method. Deflections of simple beams and pin - jointed plain trusses. Deflections of statically determinate bent frames.

Three Hinged Arches: Introduction - Types of arches - comparison between three hinged arches and two hinged arches. Linear Arch. Eddy's theorem. Analysis three hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three Hinged circular arch at Different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT - III

Propped Cantilever and Fixed beams: Analysis of Propped Cantilever and Fixed beams, including the beams with varying moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads- shear force and bending moment diagrams for Propped cantilever and Fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT - IV

Slope - Deflection Method and Moment Distribution Method: Introduction - Continuous beams. Clapeyron's theorem of three moments- Analysis of continuous beams with constant variable moments of inertia with one or both ends fixed- continuous beams with overhang. Effects of sinking of supports. Derivation of slope- Deflection Equation, Application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and bending moment diagrams, Elastic curve.

UNIT - V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M. due to single concentrated load U.D. load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads- Equivalent uniformly distributed load- Focal length. Definition of influence line for SF, influence line for BM- load position for maximum SF at a section- load position for maximum BM at a section- Point load, UDL longer than the span, UDL shorter than the span- influence line for forces in members of Pratt and Warren trusses.

TEXT BOOKS:

1. Structural Analysis Vol-I & II by Vazarani and Ratwani, Khanna Publishers.
2. Structural Analysis Vol-I & II by Pundit and Gupta, Tata McGraw Hill Publishers.

REFERENCE:

1. Basic Structural Analysis by K.U.Muthu et al, I.K. International Housing Pvt. Ltd.
2. Structural Analysis by Hibbeler Pearson Education Ltd.
3. Basic Structural Analysis C.S. Reddy., Tata McGraw Hill Publishers
4. Fundamentals of Structural Analysis by M.L.Gamhir, PHI.

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B.Tech. - II Year – II Semester

L T/P/D C
4 /-/- 4

(R16CIV 1107) BUILDING MATERIALS, CONSTRUCTION & PLANNING

UNIT - I

Stones and Bricks, Tiles: Building Stones - Classification and quarrying - properties - structural requirements - dressing Bricks - Composition of Brick earth - Manufacture and Structural requirements.

Wood, Aluminum, Glass and Paints: Wood - Structure - Types and Properties - Seasoning - defects; alternate materials for wood - GI/fiber - reinforced glass bricks, steel and aluminum.

UNIT - II

Cement & Admixtures: Ingredients of cement, manufacture - Chemical composition - Hydration - field and lab tests Admixtures - mineral & chemical admixtures - uses.

UNIT - III

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

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

UNIT - IV

Masonry and Finishing's: Brick Masonry - types - bonds; Stone masonry - types; Composite Masonry - Brick - Stone - composite; Concrete, Reinforced brick

Finishers: Plastering, Pointing, Painting, Claddings - Types - Tiles - ACP

Form work: Requirements - Standards - Scaffolding - Design; Shoring - Underpinning.

UNIT - V

Building Planning: Principles of Building Planning, Classification of buildings and Building by laws

TEXT BOOKS:

1. Building Materials and Construction - Arora and Bindra, Dhan Pat Roy Publications
2. Building Constructions by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Lakshmi Publications(P) Ltd., New Delhi.

REFERENCE:

1. Building Materials by Duggal, New Age International.
2. Building Construction by PC Verghes PHI.
3. Construction Technology - Vol - I & II by R. Chuddy, Longman UK.
4. Basics of Civil Engg by Subash Chander; Jain Brothers.
5. Alternate Building material and Technology, K.S. Jagadish, Venkatarama Reddy and Others; New Age Publications.

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B.Tech. - II Year – II Semester

L T/P/D C
- /-3/- 2

(R16CIV 1203) COMPUTER AIDED DRAFTING OF BUILDINGS

1. Introduction to computer aided drafting
2. Software for CAD - Introduction to different software's
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
 - a. single storeyed buildings
 - b. multi storeyed buildings
5. Developing sections and elevations for
 - a. single storeyed buildings
 - b. multi storeyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD software's
7. Exercises on development of working of buildings

TEXT BOOKS:

1. Computer Aided Design Laboratory by M.N. Sessa Praksh & Dr. G.S. Servesh - Laxmi Publications.
2. Engineering Graphics by P.J. Sha - S.Chand & Co.

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B.Tech. - II Year – II Semester

L T/P/D C
- /-3/- 2

(R16CIV 1204) SURVEYING LAB – II

1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Leveling - Heights and distance problem (Two Exercises)
4. Heights 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. Determine of area using total station
8. Traversing using total station
9. Contouring using total station
10. Determination of remote height using total station
11. State-out using total station
12. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF EQUIPMENTS

1. Theodolites and leveling staffs.
2. Tachometers.
3. Total station.

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B.Tech. - III Year – I Semester

L	T/P/D	C
4	/-/-	4

(R16CIV 1108) CONCRETE TECHNOLOGY

UNIT - I:

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

Admixtures: Types of admixtures- mineral and chemical admixtures- properties- dosages- effects-usage.

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 of 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.

UNIT - II:

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

UNIT - III:

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

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

ELASTICITY, CREEP & SHRINKAGE- Modulus of elasticity- Dynamic modulus of elasticity- Poisson's ratio- Creep of concrete- Factors influencing creep- Relation between creep & time- Nature of creep- Effects of creep- Shrinkage - types of shrinkage.

UNIT - IV:

Mix Design: Factors in the choice of mix proportions- Durability of concrete- Quality Control of concrete- Statistical Quality control- Acceptance criteria- Proportioning of concrete mix by normal pumpable concretes by- BIS method of mix design.

UNIT - V:

Special Concretes: Light weight concrete- Light weight aggregate concrete- Cellular concrete- No-fines concrete- Fibre reinforced concrete- Polymer concrete- Types of Polymer concrete- Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A.M.Naville - Low priced Edition - 4th edition.
2. Concrete Technology by M.S.Shetty. - S.Chand & Co.

REFERENCES BOOKS:

1. Concrete Technology by Job Thomas, Cengage Learning.
2. Concrete Technology by M.L. Gambir. - Tata Mc.Graw Hill Publishers, New Delhi.
3. Concrete Technology by A.R. Santha Kumar, Oxford university Press New Delhi.
4. Concrete: Micro structure, Properties and Materials - P.K.Metha and J.M.Monteiro, Mc-Graw Hill Publisher.

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B.Tech. - III Year – I Semester

L T/P/D C
3 /-1/- 3

(R16CIV1109) REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING

UNIT - I:

Concepts of RC. Design - Limit State method - Material Stress - Strain Curves - Safety factors - Characteristic values. Stress Block parameters - IS - 456 - 2000 - Working Stress Method.

Beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT - II:

Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion - concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.

UNIT - III:

Design of Two-way slabs, one way slab, continuous slab Using I S Coefficients, Cantilever slab / Canopy slab.

UNIT - IV:

Short and Long columns - axial loads, uni axial and biaxial bending I S Code provisions.

UNIT - V:

Design of Footings - isolated (square, rectangular) and Combined footings. Design of Stair case.

TEXT BOOKS:

1. Limit state designed for reinforced concrete - P.C. Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Prenesh, New age International Publishers, New Delhi.
3. Reinforced concrete design by S. Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
4. Fundamentals of reinforced concrete by N.C. Sinha and S.K. Roy, S. Chand publishers.

REFERENCES:

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Pprivate Ltd., New Delhi.
2. Reinforced concrete structural elements - behaviour , Analysis and design by P. Purushotham, Tata Mc.Graw-Hill, 1994.
3. Plasticity in Reinforced Concrete by Chen - Cengage Learning Pvt. Ltd.
4. Design of concrete structures - Arthus H. Nilson, David Darwin , and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
5. Design of Reinforced Concrete Foundations - P.C. Varghese Prentice Hall of India, New Delhi.
6. Reinforced concrete structures, Vol. 1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar jain, Laxmi, publications Pvt. Ltd. New Delhi.
7. Reinforced concrete structures - I.C. Syal & A.K. Goel, S. Chand Publishers.
8. Limit State Design by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

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B.Tech. - III Year – I Semester

L	T/P/D	C
3	/-1/-	3

(R16CIV 1110) ENGINEERING GEOLOGY

UNIT - I:

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

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

UNIT - II:

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as zircon, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite. **Petrology:** Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Macroscopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT - III:

Structural Geology: Indian stratigraphy, paleontology and geological time scale, Outcrop, strike and dip study of common geological structures associating with the rock such as folds, faults unconformities, and joints - their important types. Ground water: Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earthquakes, their causes and effects, shield areas and seismic belts. Seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, landslides hazards, water in landslides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

UNIT - IV:

Geology of Dams and Reservoirs: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs. Geo hazards, ground subsidence. Geophysical studies: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT - V:

Tunnels: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels, Tunnels in rock, subsidence over old mines, mining substances.

TEXT BOOKS:

1. Engineering Geology by N. Chennkesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.
2. Principals of Engineering Geology by K.V.G.K Gokhale - B.S. Publications
3. Engineering Geology by Subinoy Gangopadhyay, Oxford University press.

REFERENCES:

1. Engineering Geology for Civil Engineering, P.C. Varghese, PHI Learning & private Limited.
2. Geology basics of Engineering by Aurele Parriaux, CRC press
3. Krynine & Judd, principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.
4. F.G. Bell Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.

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L T/P/D C
3 /-1/- 3

(R16CIV 1111) GEOTECHNICAL ENGINEERING

UNIT - I:

Introduction: Soil formation - clay mineralogy and soil structure and clay mineralogy - moisture content - weight - volume relationship - Relative density.

Index Properties of Soils: Grain size analysis - Sieve analysis, principle of Hydrometer method - consistency limits and indices - I. S. Classification of soils.

UNIT - II:

Permeability: Soil water - capillary rise - flow of water through soils - Darcy's law - permeability - Factors affecting permeability - laboratory determination of coefficient of permeability - permeability of layered soils - In-situ permeability tests (Pumping in & Pumping out test).

Effective Stress & Seepage Through Soils: Total, neutral and effective stress - principle of effective stress - quick sand condition - Seepage through soils - Flownets: Characteristics and Uses.

UNIT - III:

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction - factors affecting compaction - effects of compaction on soil properties - Field compaction Equipment - compaction quality control.

UNIT - IV:

Consolidation: Types of compressibility - Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves - normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory - coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V:

Shear Strength of Soils: Importance of shear strength - Mohr's - Coulomb Failure theories - Types of laboratory tests for strength parameters - strength tests based on drainage conditions - strength envelopes - Shear strength of sands - dilatancy - critical void ratio - Liquefaction - shear strength of clays.

TEXT BOOKS:

1. Principles of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers.
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt. Ltd, New Delhi.

REFERENCES:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt. Ltd. (2002).
2. Geotechnical Engineering Handbook By Das - JRoss Publishing.
3. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
4. Geotechnical Engineering by Manoj Dutta & Gulati S. K - Tata Mc.Graw Hill Publishers New Delhi.
5. Soil Mechanics and Foundation Engg. By K. R. Arora, Standard Publishers and Distributors, Delhi.
6. Soil Mechanics and Foundation by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publishers Pvt. Ltd., New Delhi.

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L T/P/D C
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(R16CIV 1112) WATER RESOURCES ENGINEERING – I

UNIT - I:

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record - Rainfall Double Mass Curve. Runoff-Factors affecting Runoff - Runoff over a Catchment - Empirical and Rational Formulae.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-Evapotranspiration- Penman and Blaney & Criddle Methods - Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT - II:

Distribution of Runoff - Hydrograph Analysis Flood Hydrograph - Effective Rainfall - Base Flow - Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT - III:

Ground water Occurrence, 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. Types of well's, Well Construction - Well Development.

UNIT - IV:

Necessity and Importance of Irrigation, advantages and ill effects of irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility - Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT - V:

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standard for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge rational formula, SCS curve number method, flood frequency analysis- Introductory Part Only. Stream Gauging - measurement and estimation of stream flow.

TEXT BOOKS:

1. Engineering hydrology by Jayram Reddy, Laxmi publications pvt. Ltd., New Delhi.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Elementary hydrology by V. P. Singh, PHI publications.
2. Irrigation and Water Resources & Water Power by P. N. Modi, Standard Book House.
3. Water Resources Engineering - I by Dr. G. Venkata Ramana, Academic Publishing Company.
4. Irrigation Water Management by D. K. Manjundar, Printice Hall of India.
5. Irrigation and Hydraulic structures by S. K. Grag.
6. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata Mc. Graw Hill.
7. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.

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B.Tech. - III Year – I Semester

L T/P/D C
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(R16CIV1132) DISASTER MANAGEMENT (OPEN ELECTIVE)

UNIT - I:

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

UNIT - II:

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards - Planetary Hazards / Disasters - Extra Planetary Hazards / disasters - Planetary Hazards - Endogenous Hazards - Exogenous Hazards

UNIT - III:

Endogenous Hazards - Volcanic eruption - Earthquakes - landslides - Volcanic Hazards / Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards / disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

UNIT - IV:

Exogenous hazards / disasters - Infrequent events - Cumulative atmospheric hazards / disasters

Infrequent events: Cyclones - Lightning - Hailstorms

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters :- Floods - Droughts - Cold waves - Heat waves Floods :- Causes of floods - Flood hazards India - Flood control measures (Human adjustment, perception & mitigation) Droughts :- Impacts of droughts - Drought hazards in India - Drought control measures - Extra Planetary Hazards / Disasters - man induced Hazards / Disasters - Physical hazards / Disasters - Soil erosion

Soil Erosion: Mechanics & forms of Soil Erosion - Factors & causes of Soil Erosion - Conservation measures of Soil Erosion.

Chemical hazards / disasters: Release of toxic chemicals, nuclear explosion - Sedimentation processes Sedimentation processes :- Global Sedimentation problems - Regional Sedimentation problems - Sedimentation & Environmental problems - Corrective measures of Erosion & Sedimentation

Biological hazards / disasters: Population Explosion.

UNIT - V:

Emerging approaches in Disaster Management - Three stages

1. Pre-disaster Stage (preparedness)
2. Emergency Stage
3. Post Disaster stage - Rehabilitation

TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pradeep Sahni
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman - Cengage Learning

REFERENCES:

1. R. B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawann 1997
3. Kates, B. I & White, G. F The Environment as Hazards, oxford, New York, 1978
4. R. B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H. K. Gupta (Ed) Disaster Management, Universities Press, India, 2003
6. R. B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender, Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003
8. A. S. Arya Action Plan For Earthquake, Disaster, Mitigation in V. K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R. K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi
10. M. C. Gupta Manuals on Natural Disaster Management in india, National Centre for Disaster Management, IIPA, New Delhi, 2001.

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**(R16CIV1123) INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE)**

UNIT - I:

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT - II:

Trade Marks: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III:

Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT - IV:

Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition: Misappropriation right of publicity, False advertising.

UNIT - V:

New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah, E. Bouchoux, cengage learning.
2. Intellectual property right - Unleashing the knowledge economy, prabuddha ganguli, Tata Mc Graw Hill Publishing Company Ltd.

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L	T/P/D	C
4	/-/-	4

(R16HAS1105) HUMAN VALUES AND PROFESSIONAL ETHICS (OPEN ELECTIVE)

Objectives: This introductory course input is intended.

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction - Need, basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and Prosperity - A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:

Understanding Harmony in the nature and Existence - Whole existence as Co-existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astiva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a. Ability to utilize the professional competence for augmenting universal human order,
- b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order.

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

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumaner, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

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B.Tech. - III Year – I Semester

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(R16CIV 1205) FLUID MECHANICS & HYDRAULIC MACHINES LAB

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance characteristics of a single stage / multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

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B.Tech. - III Year – I Semester

L T/P/D C
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(R16CIV 1206) ENGINEERING GEOLOGY LAB

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under theory.
3. Megascopic and microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of SIX (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of Geological map along with a geological section.
4. Simple strike and Dip problems.

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(R16CIV1116) STEEL STRUCTURES DESIGN AND DRAWING

UNIT – I

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads–and combinations loading wind loads on roof trusses, behavior of steel, local buckling. Concept of limit State Design – Different Limit States as per IS 800 -2007 – Design Strengths- deflection limits – serviceability - Bolted connections – Welded connections – Design Strength – Efficiency of joint – Prying action Types of Welded joints - Design of Tension members – Design Strength of members.

UNIT – II

Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns –column splice – column base
– slab base.

UNIT – III

Design of Beams – Plastic moment – Bending and shear strength laterally / supported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams, Design of Purlin.

UNIT – IV

Design of eccentric connections with brackets, Beam end connections – Web angle – Un-stiffened and stiffened seated connections (bolted and Welded types) Design of truss joints

UNIT – V

Design of welded plate girders – optimum depth Design of main section – Design of end bearing stiffness and intermediate stiffness

Connection between web and flange and Design of flange splice and web splices.

TEXT BOOKS :

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010.

REFERENCE BOOKS :

1. Design of Steel structures by K.S. Sai Ram, Person Education.
2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer
Tata McGraw-Hill Education pvt. Ltd.
3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.
4. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.

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L T/P/D C
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(R16CIV 1117) ENVIRONMENTAL ENGINEERING

UNIT – I

Introduction: Water supply schemes – Protected water supply – Population forecasts, design period – water demand – Types of demand – factors affecting – fluctuations – fire demand – Sources of Water– intakes – infiltration galleries, confined and unconfined aquifers – water quality parameters and testing – drinking water standards.

UNIT II

Layout and general outline of water treatment units – sedimentation, uniform settling velocity– principles – design factors – surface loading – Jar test – optimum dosage of coagulant - coagulation-flocculation, clarifier design – coagulants – feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – types of disinfection - theory of chlorination - chlorine demand - other disinfection treatment methods. Distribution systems – Types of layouts of Distribution systems – design of distribution systems - Hardy Cross and equivalent pipe methods - service reservoirs – Determination of Storage capacity.

UNIT - III

Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage –examination of sewage – B.O.D. – C.O.D. equations. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing.

UNIT – IV

Layout and general outline of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles and design of biological treatment – trickling filters – standard and high rate- Filters – ASP – ASP modification – Aeration.

UNIT - V

Construction and design of oxidation ponds – Oxidation ditches – Sludge Treatment - Sludge digestion tanks –design of Digestion tank –Factors affecting sludge digestion - Sludge disposal by drying – septic tanks - working principles and design – soak pits. Ultimate disposal of waste water – self purification of rivers – Sewage farming..

TEXT BOOKS:

1. Water Supply & Sanitary Engineering by G.S.Bindie.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi.
3. Water Supply Engineering Vol.1 & Waste water Engineering Vol. II, P.N. Modi, Standard Book Publishers, Newdelhi.

REFERNCES :

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel.
3. Water and Waste Water Engineering by Fair Geyer and Okun.
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, PHI.
5. Waste water Engineering by Metcalf and Eddy.
6. Theory & Practice of Water & Wastewater Treatment by Ronald L Droste, Wiley India Publishers.

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3	/-1/-	3

(R16CIV 1119) TRANSPORTATION ENGINEERING - 1

UNIT I

Highway Development and Planning: Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns – Highway Alignment-Factors affecting Alignment- Engineering Surveys – Drawings and Reports – Highway Project.

UNIT – II

Highway Geometric Design: Importance of Geometric Design - Design controls and Criteria - Highway Cross Section Elements - Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III

Traffic Engineering & Regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – On street & Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT – IV

Intersection Design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

Unit - V

Highway Material, Construction and Maintenance: Highway Material Characterization: Sub grade Soil, Stone Aggregates, Bitumen Materials, Construction of Gravel Roads - Construction of Water Bound Macadam Roads - Construction of Bituminous Pavements: Surface Dressing, Bitumen Bound Macadam, Bituminous Concrete - Construction of Cement Concrete Pavements - Construction of Joints in Cement Concrete Pavements – Joint Filler and Seal - Pavement Failures – Maintenance of Highways – Highway Drainage.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.

REFERENCES:

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.B.Lal - Khanna Publications.
3. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981).

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3 /-1/- 3

(R16CIV1122) FOUNDATION ENGINEERING

UNIT – I

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

Slope Stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number-Stability of slopes of earth dams under different conditions.

UNIT – III

Earth Pressure Theories: Rankine's theory of earth pressure – earth pressures different soils and layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT – IV

Shallow Foundations - Strength Criteria - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

Shallow Foundations - Settlement Criteria - Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity - allowable settlements of structures.

Pile Foundation: Types of piles – Load carrying capacity of piles based on static pile formulae in different soils- Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT - V

Well Foundations: Types – Different shapes of wells – Components of wells – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Das, B.M., - (2012) Principles of Foundation Engineering –Cengage Learning
2. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004)
3. .Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd 1998.
2. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
3. Teng, W.C – Foundation Design , Prentice Hall, New Jersey.
4. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.

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(R16CIV1115) STRUCTURAL ANALYSIS -II

UNIT – I

Moment Distribution Method - Analysis of Single Bay Single Storey Portal Frames including side Sway. Analysis of inclined frames.

Kani's Method: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey and single bay two Storey Frames by Kani's Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

UNIT – II

Slope Deflection Method: Analysis of Single Bay – single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

Two Hinged Arches: Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – III

Approximate Methods of Analysis: Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method. Analysis of multi-storey frames for gravity (vertical) loads. Substitute Frame method. Analysis of Mill bents.

UNIT – IV

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy - Analysis of continuous beams including settlement of supports, using stiffness method. Analysis of pin-jointed determinate plane frames using stiffness method- Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexibility method. Shear force and bending moment diagrams. Elastic curve.

UNIT- V

Influence Lines for Indeterminate Beams: Introduction – ILD for two span continuous beam with constant and variable moments of inertia. ILD for propped cantilever beams.

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.

TEXT BOOKS:

- 1) Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
- 2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.
- 3) Structural Analysis SI edition by Aslam Kassimali, Cengage Learning.

REFERENCES:

- 1) Matrix Analysis of Structures by Singh, Cengage Learning Pvt. Ltd.
- 2) Structural Analysis by Hibbeler.
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Matrix Analysis of Structures by Pundit and Gupta., Tata McGraw Hill Publishers.
- 5) Advanced Structural Analysis by A.K.Jain, Nem Chand Bros.

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**(R16CIV1121) ELEMENTS OF EARTHQUAKE ENGINEERING
(ELECTIVE -I)**

UNIT I

Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales- Energy released-Earthquake measuring instruments-Seismo scope, Seismograph, accelerograph- strong ground motions- Seismic zones of India.

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom-Continuous system- Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system-undamped and damped-critical damping-Logarithmic decrement- Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT II

Conceptual design: Introduction-Functional planning-Continuous load path-Overall form- simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members- Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel.

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT III

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members- Structural models for frame buildings- Seismic methods of analysis- Seismic design methods- IS code based methods for seismic design-Seismic evaluation and retrofitting- Vertical irregularities- Plan configuration problems- Lateral load resisting systems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT IV

Masonry Buildings: Introduction- Elastic properties of masonry assemblage-Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT V

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements-Prevention of non-structural damage- Isolation of non-structures. Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction-Impact of Ductility- Requirements

for Ductility- Assessment of Ductility-Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams, columns and joints in RC buildings during earthquakes- Vulnerability of open ground storey and short columns during earthquakes

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press.
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
2. Earthquake Resistant Design of Building structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd.
4. Masonry and Timber structures including earthquake Resistant Design –Anand S.Arya, Nemchand & Bros.
5. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murthy.

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(R16CIV1134) GROUND IMPROVEMENT TECHNIQUES (ELECTIVE -I)

UNIT – I

Introduction to Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT – II

Mechanical Modification – Deep Compaction Techniques- Blasting Vibrocompaction, 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,

UNIT – IV

Physical and Chemical Modification – Modification by admixtures, Shotcreting and Guniting Technology, 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, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications.

REFERENCES:

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey.
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement
4. Mosley – Ground Improvement.

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**(R16CIV1124) GROUND WATER HYDROLOGY
(ELECTIVE -I)**

UNIT – I

Ground Water Occurrence and Movement: Ground water hydrologic cycle, origin of ground Water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention. Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinates system, ground water flow contours their applications.

UNIT – II

Analysis of Pumping Test data-I: Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests. Unsteady flow towards a well – Non equilibrium equations- Thesis solution-Jacob and Chow's simplifications, Leak aquifers.

UNIT – III

Surface and Subsurface Investigation: Surface methods of exploration-Electrical resistivity and Seismic refraction methods. Subsurface methods-geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – IV

Artificial Recharge of Ground Water: Concept of artificial recharge-recharge methods, relative merits. Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – V

Saline Water Intrusion In aquifers: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion.

TEXT BOOKS:

1. Ground Water Hydrology by H. M. Raghunath, Wiley Eastern Ltd.
2. Introduction to Hydraulics & Hydrology: With Applications for Stormwater Management, 4th Edition, Cengage Learning.

REFERENCES:

1. Ground water Hydrology by David Keith Todd, John Wiley &sons. New York.
2. Ground water by Bawver, John Wiley &sons.
3. Hydrology by Subramanya K.

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(R16CIV1114) ENVIRONMENTAL IMPACT ASSESSMENT (ELECTIVE -I)

UNIT I

Definition of EIA, Types of EIA, Various types of Environmental Impacts: Direct Impacts, Indirect Impacts, Cumulative Impacts, Induced Impacts, EIA Principles, Process, Benefits and Flaws, Environmental Impact Statement, Objectives of EIA, Environmental Sustainability, Identification of Potential Impacts, Affected Environment, Impact prediction, Impact Assessment, Impact Mitigation, Selecting the Proposed Action, Environmental Monitoring, Public consultation.

UNIT II

Creation of EIA Data Base, Compilation, Environmental Inventory: Baseline Data Generation, Environmental Monitoring Networking Design (EMND), Monitoring Stations, Data Products and Sources, Impact Identification (II) Methodologies, Interaction-Matrix Methods, Use of the Leopold Matrix, Checklist Methodologies: Simple Checklists, Descriptive Checklists, Uses of Checklists, Network Methodologies.

UNIT III

Meteorological Data, Ambient Air Quality Monitoring, Air Quality Standards and Regulations, Impact Prediction, Impact Prediction Approach, Utilization of Dispersion Models, Impact Prediction Tools, Impact Assessment (IA): Significance and Assessment of the Impacts, Impact Mitigation Measures, **Impacts on Water Environment** - Sources of Pollution, Major Pollutants- Water Quality parameters, Surface Water Contaminants and their Impacts, Existing Groundwater Quality Environment – Standards – Prediction and Assessment of Impacts – Mitigation measures.

UNIT IV

Soil Pollution, Causes, Soil erosion, Desertification, Salinization, Acidification, Land Filling of Waste, Impacts on Soils, Conceptual Approach: Identification, prediction and assessment of Soil Quantity-Quality Impacts, Description of Existing Resources, Identification and Incorporation of Mitigation Measures, Impacts on Noise Environment: Basics of Noise Pollution, Noise Exposure Forecast (NEF), Standards and Guidelines, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures.

UNIT V

Status of Wetlands, Threats to Wetlands, Ecology Impact Assessment System: **Importance of Biological Impact Assessment**, Identification, Prediction and Assessment and Significance of Biological Impacts, Mitigation Measures, Conservation of Flora & Fauna, **Impacts on Socio Economic and Other Environment**: Components, C o n s i d e r a t i o n s , Human Environment: Socio Economic Factors - Advantages of Impact Assessment – Assessment of Impact on Historical Structures – Mitigation Measures.

TEXT BOOKS:

1. Environmental Impact Assessment, Canter, L.W., 1977, McGraw Hills, New York.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers.

REFERENCES:

1. Technological guidance manuals of EIA. MoEF, GoI.
2. Environmental Impact Assessment, 2003, Y. Anjaneyulu, B.S Publications.
3. Environmental Impact Assessment Principles and applications, Erickson, P.A.
4. Environmental Impact Assessment: Theory and Practice, Dr.M.Anji Reddy, BS Publications.

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(R16CIV1139) PRINCIPLES OF ENTREPRENEURSHIP (ELECTIVE -I)

Unit I:

Introduction to Entrepreneurship: Definition of Entrepreneur Entrepreneurial Traits. Entrepreneur vs. Manager, Creating and Starting the venture: Sources of new ideas, methods of generating ideas, creative problem solving - Writing Business Plan, Evaluating Business Plans. Launching formalities.

Unit II:

Financing and Managing the new venture: Sources of capital, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and entrepreneurship, Internet advertising- New venture Expansion Strategies and Issues.

Unit III:

Institutional/financial support: Schemes and functions of Directorate of Industries, District Industries Centers (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and Village Industries Commission (KVIC), Technical Consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI).

Unit IV:

Production and Marketing Management: Thrust areas of production management, Selection of production Techniques, Plant utilization and maintenance, Designing the work place, Inventory control , material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

Unit V :

Labour legislation, Salient Provisions of Health, Safety, and Welfare under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

TEXT BOOKS:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH,2009.
2. Dollinger: Entrepreneurship, Pearson,2009.

REFERENCE BOOKS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, 2009.
2. Harvard Business Review on Entrepreneurship, HBR Paper Back.
3. Robert J.Calvin: Entrepreneurial Management, TMH, 2009.

4. Gurmeet Naroola: The entrepreneurial Connection, TMH, 2009.
5. Bolton & Thompson: Entrepreneurs—Talent, Temperament and Techniques, Butterworth Heinemann, 2009.
6. Agarwal: Indian Economy, Wishwa Prakashan 2009.
7. Dutt & Sundaram: Indian Economy,S.Chand, 2009
8. B D Singh,;Industrial Relations & Labour Laws, Excel, 2009.
9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2009.
10. Essential of entrepreneurship and small business management by Thomas W.Zimmerer & Norman M.Searborough, PHI-2009.
11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.

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(R16CIV 1207) GEOTECHNICAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Atterberg's Limits (LL & PL)
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Note: Any eight experiments may be completed.

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(R16HAS1202) ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

Introduction

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use ‘good’ English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students’ fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one’s writing.

4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

Prescribed Lab Manual: A book titled *A Course Book of Advanced Communication Skills (ACS) Lab* published by Universities Press, Hyderabad.

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner’s Compass, 7th Edition**
- **DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider, by Dreamtech**
- **TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)**
- **The following software from ‘train2success.com’**
 - **Preparing for being Interviewed**
 - **Positive Thinking**
 - **Interviewing Skills**
 - **Telephone Skills**
 - **Time Management**

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.

7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. Seminar/ Professional Presentation

2. A Report on the same has to be prepared and presented.

** Teachers may use their discretion to choose topics relevant and suitable to the needs of students.*

** Not more than two students to work on each mini project.*

** Students may be assessed by their performance both in oral presentation and written report.*

Outcomes

- ☞ Accomplishment of sound vocabulary and its proper use contextually.
- ☞ Flair in Writing and felicity in written expression.
- ☞ Enhanced job prospects.
- ☞ Effective Speaking Abilities

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(R16CIV1128) REMOTE SENSING & GIS

UNIT – I

Introduction to Photogrammetry: Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducially line.

UNIT – II

Remote Sensing –: Basic concept of Remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process.

Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input-Attribute data Management –Data display- Data Exploration- Data Analysis. COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters-Commonly used Map Projections - Projected coordinate Systems

UNIT –IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object Based Vector Data Model; Classes and their Relationship; The geobase data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT –V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, Creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, Data Editing

TEXT BOOKS:

- 1 Remote sensing of the environment – An earth resource perspective
– 2nd edition – by John R. Jensen, Pearson Education.
- 2 Introduction to Geographic Information System – Kang-Tsung Chang, Tata McGraw-Hill Education Private Limited.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.

2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

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(R16CIV1120) TRANSPORTATION ENGINEERING -II

UNIT – I

Introduction to Railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT – II

Geometric Design of Railway Track: Gradients- Grade Compensation-Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT – III

Airport Engineering: Airport Site selection – Runway Orientation – Basic Runway Length – Corrections for Elevation, Temperature – Airport Classification - Runway Geometric design – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT – IV

Port and Harbour Engineering: Requirements of Port and Harbour, Classification of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwaters, Dry docks, Jetties, Aprons, Transit shed and Warehouses, Navigational aids, Maintenance of Port and Harbours, Inland Water Transport

UNIT –V

Intelligent Transport Systems: ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications; Advanced Traffic Management systems (ATMS), Advanced Public Transportation systems (APTS), ITS architecture components and standards, Overview of ITS implementations in developed countries.

TEXT BOOKS:

1. Satish Chandra and Agarwal, M.M. (2007) “Railway Engineering” Oxford Higher Education, University Press New Delhi.
2. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.
3. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).
4. Transportation Engineering and Planning – C.S. Papacostas, P.D.Prevedouros.

REFERENCES:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian.
3. Harbour, Dock and Tunnel Engineering – R. Srinivasan.
4. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza.

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B.Tech. - IV Year – I Semester

L T/P/D C
3 /-1/- 3

(R16CIV1130) ESTIMATING & COSTING

UNIT – I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings.

UNIT – II

Earthwork for roads and canals.

UNIT - III

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT -IV

Reinforcement bar bending and bar requirement schedules. Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT – V

Valuation of buildings. Standard specifications for different items of building construction.

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.).
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. National Building Code.

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B.Tech. - IV Year – I Semester

L	T/P/D	C
3	/-1/-	3

(R16CIV1118) WATER RESOURCES ENGINEERING-II

UNIT-I

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir.. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

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.

Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-V

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall. Canal regulation works, design principles of distributory and head regulators, Cross Regulators - canal outlets, types of canal modules,

Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers.
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta.
3. Irrigation engineering by K.R.Arora.
4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers.
5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.
6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University Press.

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L T/P/D C
4 /-/-/ 4

**(R16MED1118) FINITE ELEMENT METHODS
(ELECTIVE-II)**

UNIT – I

Introduction to Finite Element Method – Basic Equations in Elasticity – stress strain equations – concept of plane stress – plane strain— advantages and disadvantages of FEM.

Element shapes – nodes – nodal degree of freedom – strain displacement relations.

UNIT – II

Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix

FEA Beam elements – stress strain relation- shape functions -stiffness matrix– continuous beams.

UNIT – III

FEA Two dimensional problem – CST – LST element – shape function – stress – strain.

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element –shape functions.

UNIT – IV

Isoparametric formulation – Concepts of isoperimetric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements.

UNIT-V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:

1. Introduction to Finite elements in engineering by Chandrupatla, Belegundu, Prentice Hall.
2. Finite element method by Daryl L. Logan, CENGAGE Learning.

REFERENCES:

1. Finite element analysis by S.S. Bhavikatti-New age International publishers.
2. Finite element analysis by P. Seshu, PHI.

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B.Tech. - IV Year – I Semester

L T/P/D C
4 /-/-/ 4

**(R16CIV1133) ADVANCED FOUNDATION ENGINEERING
(ELECTIVE-II)**

UNIT – I

Introduction-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils - Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertamaunn's method, Janbu method.

UNIT – II

Pile Foundations – pile groups- settlement of pile groups resting in sands and clays - negative skin friction-under reamed piles-laterally loaded piles – ultimate lateral capacity - Broms Method - Reese and Matlock Approach.

UNIT – III

Lateral earth pressures theories – Rankine's and Coulomb's theories – Graphical Methods, Culmann's, Trial Wedge methods - Stability checks of cantilever and gravity retaining walls.

UNIT - IV

Cantilever and anchored sheet piles - earth pressure diagram - determination of depth of embedment in sands and clays – braced cuts - earth pressure diagrams – forces in struts.

UNIT – V

Foundations in Expansive Soils – problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – foundation practices – sand cushion – CNS technique – under-reamed pile foundations
– granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS:

- 1) Das, B.M., - (1999) Principles of Foundation Engineering –4th edition PWS Publishing, Singapore.
- 2) Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill International.
- 3) Soil Mechanics and Foundation Engineering by V N S Murthy, CBS Publishers and Distributors.

REFERENCE BOOKS:

- 1) Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
- 2) Geotechnical Engineering by C. Venkataramah, NewAge International Pvt.Ltd, Publishers (2002).
- 3) Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).
- 4) Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd, Publishers (2002).

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B.Tech. - IV Year – I Semester

L T/P/D C
4 /-/- 4

(R16CIV1127) WATERSHED MANAGEMENT (ELECTIVE-II)

UNIT-I

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-II

Watershed delineation – Runoff Computations from a watershed – Flood Frequency Analysis – Gumbell, Log Pearson and Weibull Methods of Analysis.

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements

UNIT-III

Principles of Erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

Measures to Control Erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-IV

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

UNIT-V

Forest and Grass Land Management: Interpretation of Satellite Imageries-Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

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, horticulture, social forestry and a forestation.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

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B.Tech. - IV Year – I Semester

L T/P/D C
4 /-/- 4

(R16CIV1140) AIR POLLUTION AND CONTROL
(ELECTIVE-II)

UNIT – I

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary air pollutants, Point, Line and Areal Sources of air pollution- Stationary and mobile sources. Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT – II

Meteorology and Plume Dispersion; Properties of atmosphere; Heat, Pressure, Wind forces, Moisture and Relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams. Lapse Rates, Pressure Systems, Winds and moisture, plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-III

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.

Equipment's – Settling Chambers, Cyclone separators, filters, Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV

Control of gaseous emissions - General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling – Adsorption – Absorption – Combustion.

UNIT – V

Air Quality Management – Monitoring of SPM, SO_x; NO_x 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.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.

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B.Tech. - IV Year – I Semester

L T/P/D C
4 /-/- 4

**(R16CIV1125) ADVANCED STRUCTURAL DESIGN
(ELECTIVE-III)**

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 slabs- Design of Raft and pile foundations .

UNIT-IV

Design of Concrete Bridges – IRC loading Design of Stab bridge, T-beam girder bridge.
Introduction to Steel bridges.

UNIT-V

Design of RCC Chimneys Bunkers & Silos.

TEXT BOOKS:

1. Advanced Reinforced Concrete Structures by Varghese, Pranties Hall of India Pvt. Ltd.
2. Bridge Engineering by S Ponnuswamy Mc Graw Hill Co.
3. Reinforced Concrete Design by S.A. Pillai and D. Menon, Tata Mc. Ghrawhill Publishing Company.
4. Advanced Reinforced Concrete Structures by Krishna Raju.

REFERENCES :

1. Reinforced Concrete Structures Vol. 2 by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt. Ltd., New Delhi.
2. Essentials of Bridge Engineering by D. John Son Victor, Oxford and IBM Publication Co., Pvt. Ltd.

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B.Tech. - IV Year – I Semester

L T/P/D C
4 /-/- 4

**(R16CIV1126) EARTH AND ROCK FILL DAMS AND SLOPE STABILITY WATER
(ELECTIVE-III)**

UNIT-I

Earth and Rockfill Dams: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclinometers, Stress measurements, Seismic measurements.

UNIT-II

Failures, Damages and Protection of Earth Dams: Nature and importance of failure, Piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters, Treatment of upstream and downstream of slopes, Drainage control, Filter design.

UNIT-III

Slope Stability Analysis: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long term stability in slopes. Taylor Charts.

UNIT-IV

Methods of Slope Stability: Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Non-circular Failure Surfaces: Janbu Analysis, Sliding Block Analysis, Seismic stability, Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/ micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT-V

Rockfill Dams: Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

Text Books:

1. Sherard, Woodward, Gizienski and Clevenger. Earth and Earth-Rock Dams. John Wiley & Sons. 1963.

References:

1. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams, 1999
2. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams, Willams, R.C., and Willace, T.S. 1965.
3. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilisation methods – John Wiley & sons. (2002)
4. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.
5. Christian, Earth & Rockfill Dams – Principles of Design and Construction, Kutzner Published Oxford and IBH.
6. Ortiago, J. A. R. and Sayao, A. S. F. J. - Handbook of Slope Stabilisation, 2004.

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B.Tech. - IV Year – I Semester

L	T/P/D	C
4	/-/-	4

(R16CIV1131) WATER RESOURCES SYSTEMS ANALYSIS (ELECTIVE-III)

UNIT - I

Introduction: Definition of system, Types of systems, System approach, System analysis and types of systems, Techniques of water resources system analysis.

Systems Techniques in Water Resources: Objective function and constraints, optimization using calculus, Optimization of a function of single variable, Optimization of a function of multiple variables, Constrained optimization, Kuhn – Tucker conditions.

UNIT - II

Linear programming –I: Formulation of linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT - III

Linear programming –II:

Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT - IV

Dynamics programming: Belman's principles of optimality forward and backward recursive dynamic programming, curse of dimensionality, application of dynamic programming for resource allocation.

UNIT - V

Water Resources Economics: Basics of Engineering economics, Discount factors, Uniform annual series, Amortization, Comparison of alternate plans. Principles of Economics analysis, Conditions of project optimality, benefit cost analysis socio economic intuitional and pricing of water resources.

TEXT BOOKS:

- 1 Water Resources System Analysis – Vedula & Mujumdar – Tata Mc. Graw Hill Company Ltd.
- 2 Water Resources Economics - James & Lee. Oxford Publishers 2005.

REFERENCES:

- 1 Operational Research by Taha, Printice Hall of India publishers.
2. Water Resources project Economic by Kuiper.E.
3. Engineering optimization: Theory and Practice, Rao, Singiresu S. New Age International.

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B.Tech. - IV Year – I Semester

L T/P/D C
4 /-/- 4

**(R16CIV1113) INDUSTRIAL WASTE WATER TREATMENT
(ELECTIVE-III)**

UNIT – I

Sources of Pollution – Physical, Chemical, Organic and Biological properties of Industrial Wastes – Differences between industrial and municipal waste waters – Effects of industrial effluents on sewers and Natural Water Bodies.

UNIT – II

Pre and Primary Treatment – Equalization, Proportioning, Neutralization, Oil Separation by Floatation – Waste Reduction - Volume Reduction – Strength Reduction.

UNIT – III

Waste Treatment Methods – Nitrification and De-nitrification – Phosphorous removal – Heavy metal removal – Membrane Separation Process – Air Stripping and Absorption Processes – Special Treatment Methods – Disposal of Treated Waste Water.

UNIT – IV

Characteristics and Composition of waste water and Manufacturing Processes of Industries like Sugar, Characteristics and Composition of Industries like Food Processing Industries, Steel, Petroleum Refineries,

UNIT – V

Characteristics and Composition of Industries like Textiles, Tanneries, Atomic Energy Plants and other Mineral Processing Industries - Joint Treatment of Raw Industrial waste water and Domestic Sewage – Common Effluent Treatment Plants (CETP) – Location, Design, Operation and Maintenance Problems – Economical aspects.

TEXT BOOKS

1. Industrial Waste Water Pollution Control by W. Wesley Eckenfelder – McGraw-Hill.
2. Industrial Waste Treatment by Rao & Datta.

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B.Tech. - IV Year – I Semester

L T/P/D C
- /-3/- 2

(R16CIV 1208) CONCRETE & HIGHWAY MATERIALS LAB

I. ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES :

TESTS ON CEMENTS :

1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration).

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B.Tech. - IV Year – I Semester

L T/P/D C
- /-3/- 2

(R16CIV 1209) ENVIRONMENTAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates.
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Determination of Optimum coagulant dose.
14. Determination of Chlorine demand.
15. Presumptive coliform test.

NOTE : At least 8 of the above experiments are to be conducted.

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B.Tech. - IV Year – II Semester

L T/P/D C
3 /-1/- 3

**(R16CIV1138) REHABILITATION AND RETROFITTING OF STRUCTURES
(ELECTIVE - IV)**

UNIT – I

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention.
Mechanism of Damage – Types of Damage

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning. Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – V

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
2. Concrete Technology by A.R. Santakumar, Oxford University press.

REFERENCES

1. Defects and Deterioration in Buildings, EF & N Spon, London.
2. Non-Destructive Evaluation of Concrete Structures by Bungey – Surrey University Press.
3. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H. Ranso, (1981).
4. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B.A. Richardson, (1991).

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B.Tech. - IV Year – II Semester

L	T/P/D	C
3	/-1/-	3

**(R16CIV1141) GEO-ENVIRONMENTAL ENGINEERING
(ELECTIVE - IV)**

UNIT-I

Sources and Site Characterization: Scope of Geo-environmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterization methods.

UNIT-II

Solid and Hazardous Waste Management: Classification of waste, Characterization solid wastes, Environmental Concerns with waste, waste management strategies.

UNIT-III

Contaminant Transport: Transport process, Mass-transfer process, Modeling, NAPL

UNIT-IV

Remediation Techniques: Objectives of site remediation, various active and passive methods, Bioremediation, Phytoremediation, Remediation of NAPL sites.

UNIT-V

Landfills: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

TEXT BOOKS:

1. Phillip B. Bedient, Refai, H. S. & Newell C. J. - Ground Water Contamination - Prentice Hall Publications, 4th Edition, 2008.
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering, John Wiley & Sons (2004).

REFERENCES:

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook, Kluwer Academic, 2001.
2. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering Principles and Applications, Marcel. Dekker, Inc., New York (2000).
3. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management, New York: McGraw-Hill, 2001.

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B.Tech. - IV Year – II Semester

L	T/P/D	C
3	/-1/-	3

**(R16CIV1135) DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(ELECTIVE - IV)**

Design and drawing of the following hydraulic structures.

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practice the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

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B.Tech. - IV Year – II Semester

L	T/P/D	C
3	/-1/-	3

(R16CIV1142) SOLID WASTE MANAGEMENT (ELECTIVE - IV)

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. Incineration of solid wastes. Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; 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 substances – 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 - Physical, chemical and thermal treatment of hazardous waste: solidification, 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 characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

TEXT BOOKS:

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Samuel A. Vigil.

REFERENCES:

1. Hazardous waste management by Prof. Anjaneyulu.
2. Criteria for hazardous waste landfills – CPCB guidelines 2000.
3. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
4. Management of Solid waste in developing countries by FrankFlintoff, WHO regional publications 1976.

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B.Tech. - IV Year – II Semester

L	T/P/D	C
3	/-1/-	3

(R16CIV1137) PRESTRESSED CONCRETE STRUCTURES

UNIT I:

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing-Materials- high strength concrete and high tensile steel their characteristics.

Methods and Systems of prestressing: Pretensioning and Posttensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT II:

Losses of Prestress: Loss of prestress in pretensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT III:

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC beams of rectangular and I sections- Kern line – Cable profile and cable layout.

Shear: General Considerations- Principal tension and compression-Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- Bureau of Indian Standards (BIS) Code provisions.

UNIT IV:

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zielinski and Rowe's methods – Anchorage zone reinforcement- BIS Provisions

UNIT V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long time deflections- BIS code requirements.

TEXT BOOK:

- 1) Prestressed concrete by N.Krishna Raju, 5th Edition, Tata McGraw Hill Book Education Pvt. Ltd.

REFERENCES :

- 1) Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.
- 2) Prestressed concrete by S. Ramamrutham, Dhanpat Rai & Sons, Delhi.
- 3) Prestressed Concrete by N. Rajagopalan, Narosa Publishing House.

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B.Tech. - IV Year – II Semester

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(R16CIV1143) CONSTRUCTION MANAGEMENT

UNIT-I

Management process- Roles . management theories . Social responsibilities. planning and strategic management . strategy implementation . Decision making: tools and techniques – Organizational structure . Human resource management- motivation performance- leadership.

UNIT-II

Classification of Construction projects, Construction stages, Resources-Functions of Construction Management and its Applications .Preliminary Planning- Collection of Data-Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling .Forms of scheduling - Resource allocation . budget and budgetary control methods

UNIT-IV

Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration . negotiation - M.Book - Muster roll -stores.

UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction : legal and financial aspects of accidents in construction . occupational and safety hazard assessment. Human factors in safety . legal and financial aspects of accidents in construction . occupational and safety hazard assessment

TEXT BOOKS

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara,K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Punmia,B.C., Project Planning and Control with PERT and CPM, Laxmi Publications, new delhi,1987.

REFERENCE:

1. Construction Management And Planning by: sengupta, b. /guha, h. tata mcgraw-hill publications.

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(R16CIV1210) INDUSTRY ORIENTED MINI PROJECT

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(R16CIV1211) SEMINAR

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(R16CIV1212) PROJECT

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(R16CIV1213) COMPREHENSIVE VIVA