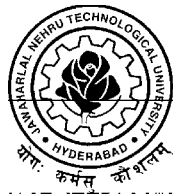


**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

28

**CIVIL AND
ENVIRONMENTAL
ENGINEERING**

For
B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2013-14)
(I - IV Years Syllabus)



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD - 500 085.

ACADEMIC REGULATIONS R13 FOR B. TECH. (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2013-14 and onwards

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

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

- 1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.
- 1.2 After eight academic years of course of study, the candidate is permitted to write the examinations for two more years.
- 1.3 The candidate shall register for 224 credits and secure 216 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

- 2 The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

3 **Courses of study**

The following courses of study are offered at present as specializations for the B. Tech. Course:

Branch Code	Branch
01	Civil Engineering
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering
08	Chemical Engineering
10	Electronics and Instrumentation Engineering

11	Bio-Medical Engineering
12	Information Technology
14	Mechanical Engineering (Mechatronics)
17	Electronics and Telematics Engineering
18	Metallurgy and Material Technology
19	Electronics and Computer Engineering
20	Mechanical Engineering (Production)
21	Aeronautical Engineering
22	Instrumentation and Control Engineering
23	Biotechnology
24	Automobile Engineering
25	Mining Engineering
26	Mining Machinery
27	Petroleum Engineering
28	Civil and Environmental Engineering
29	Mechanical Engineering (Nano Technology)
30	Agricultural Engineering
31	Computer Science & Technology

4 Credits

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03+1/03	06	04	04
	02	04	—	—
Practical	03	04	03	02
Drawing	02+03	06	03 06	02 04
Mini Project	—	—	—	02
Comprehensive Viva Voce	—	—	—	02
Seminar	—	—	6	02
Project	—	--	15	10

5 Distribution and Weightage of Marks

- 5.1 The performance of a student in each semester or I year shall be evaluated subject-wise for a maximum of 100 marks for a theory and 75 marks for a practical subject. In addition, industry-oriented mini-project, seminar and project work shall be evaluated for 50, 50 and 200 marks, respectively.
- 5.2 For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.
- 5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid-term examination consists of one objective paper, one essay paper and one assignment. The objective paper and the essay paper shall be for 10 marks each with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for essay paper). The Objective paper is set with 20 bits of multiple choice, fill-in the blanks and matching type of questions for a total of 10 marks. The essay paper shall contain 4 full questions (one from each unit) out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted on 1 to 2.5 units of the syllabus, the second mid-term examination shall be conducted on 2.5 to 5 units. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). The first Assignment should be submitted before the conduct of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. The total marks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each candidate. However, in the I year, there shall be 3 mid term examinations, each for 25 marks, along with 3 assignments in a similar pattern as above (1st mid shall be from Unit-I, 2nd mid shall be 2 & 3 Units and 3rd mid shall be 4 & 5 Units) and the average marks of the examinations secured (each evaluated for a total of 25 marks) in each subject shall be considered to be final marks for the internals/sessionals. If any candidate is absent from any subject of a mid-term examination, an on-line test will be conducted for him by the University.

The details of the Question Paper pattern without deviating from the R13 regulations as notified in the website is as follows:

- ***The End semesters Examination will be conducted for 75 marks which consists of two parts viz. i). Part-A for 25 marks, ii). Part –B for 50 marks.***
- ***Part-A is compulsory question which consists of ten sub-questions. The first five sub-questions are from each unit and carries 2 marks each. The next five sub-questions***

- are one from each unit and carries 3 marks each.**

 - **Part-B consists of five Questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an “either” “or” choice (that means there will be two questions from each unit and the student should answer any one question)**
- 5.4 For practical subjects there shall be a continuous evaluation during a semester for 25 sessional marks and 50 end semester examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed from the clusters of colleges which are decided by the examination branch of the University.
- 5.5 For the subject having design and/or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and Estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests. However, in the I year class, there shall be three tests and the average will be taken into consideration.
- 5.6 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. However, the mini-project and its report shall be evaluated along with the project work in IV year II Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.
- 5.7 There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of 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 the seminar.
- 5.8 There shall be a Comprehensive Viva-Voce in IV year II semester.

The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the student's understanding of the subjects he studied during the B. Tech. course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

- 5.9 Out of a total of 200 marks for the project work, 50 marks shall be allotted for Internal Evaluation and 150 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.
- 5.10 The Laboratory marks and the sessional marks awarded by the College are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled accordingly. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University rules and produced before the Committees of the University as and when asked for.

6 Attendance Requirements

- 6.1 A student is eligible to write the University examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
- 6.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee
- 6.3 Shortage of Attendance below 65% in aggregate shall not be condoned.
- 6.4 A student who is short of attendance in semester / I year may seek re-admission into that semester/I year when offered within 4 weeks from the date of the commencement of class work.
- 6.5 Students whose shortage of attendance is not condoned in any semester/I year are not eligible to write their end semester examination of that class and their registration stands cancelled.

- 6.6 A stipulated fee shall be payable towards condonation of shortage of attendance.
- 6.7 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester/I year, as applicable, including the days of attendance in sports, games, NCC and NSS activities.
- 6.8 If any candidate fulfills the attendance requirement in the present semester or I year, he shall not be eligible for readmission into the same class.

7 Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6.

- 7.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the end semester exam, and minimum 40% of marks in the sum total of the mid-term and end semester exams.
- 7.2 A student shall be promoted from first year to second year if he fulfills the minimum attendance requirement.
- 7.3 A student will not be promoted from II year to III year unless he fulfills the academic requirement of 34 credits up to II year I semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year II semester.
- 7.4 A student shall be promoted from III year to IV year only if he fulfills the academic requirements of 56 credits up to III year I semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.
- 7.5 A student shall register and put up minimum attendance in all 224 credits and earn 216 credits. Marks obtained in the best 216 credits shall be considered for the calculation of percentage of marks.
- 7.6 Students who fail to earn 216 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled.

8 Course pattern

- 8.1 The entire course of study is for four academic years. I year shall be on yearly pattern and II, III and IV years on semester pattern.
- 8.2 A student, eligible to appear for the end examination in a subject, but absent from it or has failed in the end semester examination, may

write the exam in that subject during the period of supplementary exams.

- 8.3 When a student is detained for lack of credits/shortage of attendance, he may be re-admitted into the next semester/year. However, the academic regulations under which he was first admitted, shall continue to be applicable to him.

9 Award of Class

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 shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	From the aggregate marks secured from 216 Credits.
First Class with Distinction	70% and above	
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

The marks obtained in internal evaluation and end semester / I year examination shall be shown separately in the memorandum of marks.

10 Minimum Instruction Days

The minimum instruction days for each semester/I year shall be 90/180 days.

- 11 There shall be no branch transfers after the completion of the admission process.
- 12 There shall be no transfer from one college/stream to another within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.

13 WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the university or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

14. TRANSITORY REGULATIONS

- 14.1 Discontinued, detained, or failed candidates are eligible for readmission as and when next offered.
- 14.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot

clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

- 14.3 In case of transferred students from other Universities, the credits shall be transferred to JNTUH as per the academic regulations and course structure of the JNTUH.

15. General

- 15.1 Wherever the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- 15.2 The academic regulation should be read as a whole for the purpose of any interpretation.
- 15.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- 15.4 The University may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the University.
- 15.5 The students seeking transfer to colleges affiliated to JNTUH from various other Universities/Institutions, have to pass the failed subjects which are equivalent to the subjects of JNTUH, and also pass the subjects of JNTUH which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of JNTUH, the candidates have to study those subjects in JNTUH in spite of the fact that those subjects are repeated.

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Academic Regulations R13 For B.Tech. (Lateral Entry Scheme)

Applicable for the students admitted into II year B. Tech. (LES) from the Academic Year 2013-14 and onwards

1 Eligibility for award of B. Tech. Degree (LES)

- I. The LES candidates shall pursue a course of study for not less than three academic years and not more than six academic years.
- II. They shall be permitted to write the examinations for two more years after six academic years of course work.

2. The candidate shall register for 168 credits and secure 160 credits from II to IV year B.Tech. Program (LES) for the award of B.Tech. degree with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

3. The students, who fail to fulfil the requirement for the award of the degree in 8 consecutive academic years (6 years of study + 2 years additionally for appearing exams only) from the year of admission, shall forfeit their seats.
4. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech. (LES).
5. **Promotion Rule**
A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.
A student shall be promoted from III year to IV year only if he fulfils the academic requirements of 34 credits up to III year I semester from all the examinations, whether or not the candidate takes the examinations.
6. **Award of Class**
After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	From the aggregate marks secured from 216 Credits.
First Class with Distinction	70% and above	
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

The marks obtained in the internal evaluation and the end semester examination shall be shown separately in the marks memorandum.

7. All the other regulations as applicable to **B. Tech. 4-year degree course (Regular)** will hold good for **B. Tech. (Lateral Entry Scheme)**.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/ Improper conduct	Punishment
	<i>If the candidate:</i>	
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.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a 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	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

	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.	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.
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

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.	
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Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
 - (i) A show cause notice shall be issued to the college.
 - (ii) Impose a suitable fine on the college.
 - (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.**B. TECH. CIVIL AND ENVIRONMENTAL ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	Total	19	16	56

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30006	Mathematics – II	4	-	4
A30203	Electrical & Electronics Engineering	4	-	4
A30107	Strength of Materials –I	4	-	4
A30108	Surveying	4	-	4
A30101	Fluid Mechanics	4	-	4
A30010	Managerial Economics and Financial Analysis	4	-	4
A30185	Surveying Lab- I	-	3	2
A30183	Strength of Materials Lab	-	3	2
	Total	24	6	28

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40008	Probability & Statistics	4	-	4
A40114	Strength of Materials - II	4	-	4
A40111	Hydraulics & Hydraulic Machinery	4	-	4
A40009	Environmental Studies	4	-	4
A40115	Structural Analysis -I	4	-	4
A40109	Building Materials, Construction & Planning	4	-	4
A40186	Computer Aided Drafting of Buildings	-	3	2
A40190	Surveying Lab- II	-	3	2
	Total	24	6	28

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50116	Concrete Technology	4	-	4
A50121	Reinforced Concrete Structures Design and Drawing	4	-	4
A50119	Environmental Engineering	4	-	4
A50120	Geotechnical Engineering	4	-	4
A50122	Water Resources Engineering-I	4	-	4
	Open Elective	4	-	4
A50117	Disaster Management			
A50017	Intellectual Property Rights			
A50018	Human Values and Professional Ethics			
A50181	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
A50192	Environmental Engineering Lab	-	3	2
	Total	24	6	28

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60130	Steel Structures Design and Drawing	3	2	4
A60118	Engineering Geology	4	-	4
A60133	Water Resources Engineering-II	4	-	4
A60126	Foundation Engineering	4	-	4
A60131	Structural Analysis -II	4	-	4
	Elective -I	4	-	4
A62802	Fundamentals of Ecology			
A62801	Environmental Chemistry			
A60128	Ground Water Hydrology			
A60129	Principles of Entrepreneurship			
A60194	Geotechnical Engineering Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	Total	23	8	28

IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70142	Transportation Engineering	4	-	4
A70141	Solid Waste Management	4	-	4
A70138	Estimating & Costing	4	-	4
A70136	Air Pollution and Control	4	-	4
	Elective-II	4	-	4
A70139	Industrial Waste Water Treatment			
A70803	Environmental Pollution of Soil & Remediation			
A70145	Watershed Management			
	Elective-III	4	-	4
A72804	Environmental Sanitation			
A70330	Finite Element Methods			
A70140	Remote Sensing & GIS			
A70195	Concrete & Highway Materials Lab	-	3	2
A70191	Engineering Geology Lab	-	3	2
	Total	24	6	28

IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A80124	Environmental Impact Assessment	4	-	4
A80146	Construction Management	4	-	4
	Elective-IV	4	-	4
A80127	Ground Improvement Techniques			
A82805	Ground Water Pollution			
A82806	Water Quality Management			
A80087	Industry Oriented Mini project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive Viva	-	-	2
	Total	12	21	28

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial L – Theory P – Practical D-Drawing C – Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CEE**

L	T/P/D	C
2	-/-	4

(A10001) 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.

SYLLABUS:**Listening Skills:****Objectives**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

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

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.
 - 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.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
 - 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.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
 - Writing sentences
 - 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, 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, 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

Outcomes:

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

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(A10002) MATHEMATICS -I**Objectives:** To learn

- The types of Matrices and their properties.
- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
- The concept of eigenvalues and eigenvectors of a matrix is to reduce a quadratic form into a canonical form through a linear transformation.
- The mean value theorems and to understand the concepts geometrically.
- The functions of several variables and optimization of these functions.
- The evaluation of improper integrals, Beta and Gamma functions.
- Multiple integration and its applications.
- Methods of solving the differential equations of 1st and higher order
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, Bending of beams etc.
- The definition of integral transforms and Laplace Transform.
- Properties of Laplace transform.
- Inverse Laplace Transform.
- Convolution theorem.
- Solution of Differential equations using Laplace transform.

UNIT-I

Theory of Matrices: Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations-Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving $m \times n$ and $n \times n$ linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation –

Orthogonal Transformation. Eigen values and eigen vectors of a matrix. Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

UNIT – II

Differential calculus methods: Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

UNIT – III

Improper integration, Multiple integration & applications: Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

Multiple integrals – double and triple integrals – change of order of integration-change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

UNIT – IV

Differential equations and applications : Overview of differential equations-exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $f(x) = e^{ax}$, $\sin ax$, $\cos ax$, and x^n , $e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V

Laplace transform and its applications to Ordinary differential equations
Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by

Partial fractions(Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem -- Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

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

REFERENCES:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

Outcome:

- After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to evaluate the multiple integrals and can apply the concepts to find the Areas, Volumes, Moment of Inertia etc., of regions on a plane or in space.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equation. Also able to apply the theory of differential equations to the real world problems.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

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(A10302) ENGINEERING MECHANICS**UNIT – I**

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law – Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Equilibrium of Force Systems : Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems - Equilibrium of Spatial Systems.

UNIT – II

Friction: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions – Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

Transmission of Power: Flat Belt Drives - Types of Flat Belt Drives – Length of Belt, tensions, Tight side, Slack Side, Initial and Centrifugal – Power Transmitted and Condition for Max. Power.

UNIT – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Moments of Inertia : Definition – Polar Moment of Inertia – Radius of gyration - Transfer formula for moment of inertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia : Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - mass moment of inertia of composite bodies.

UNIT – IV

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion– Kinematics of Rigid Body - Types of rigid body motion -Angular motion - Fixed Axis Rotation

Kinetics of particles: Translation -Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

UNIT – V

Work - Energy Method : Work energy Equations for Translation - Work-

Energy Applications to Particle Motion – Work energy applied to Connected Systems - Work energy applied to Fixed Axis Rotation and Plane Motion. Impulse and momentum.

Mechanical Vibrations : Definitions and Concepts – Simple Harmonic Motion – Free vibrations, simple and Compound Pendulums – Torsion Pendulum – Free vibrations without damping: General cases.

TEXT BOOKS:

1. Engineering Mechanics - Statics and Dynamics by Ferdinand.L. Singer / Harper International Edition.
2. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Compan.

REFERENCES:

1. Engineering Mechanics / Irving Shames / Prentice Hall.
2. A text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company.
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiyah/ Universities Press.
4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engg. Mechanics / KL Kumar / Tata McGraw Hill.
6. Engg. Mechanics / S.S. Bhavikati & K.G. Rajasekharappa.

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(A10004) ENGINEERING PHYSICS**Objectives:**

It gives

- to the students basic understanding of bonding in solids, crystal structures and techniques to characterize crystals.
- to understand the behavior of electron in a solid and thereby one can determine the conductivity and specific heat values of the solids.
- to study applications in Engineering like memory devices, transformer core and Electromagnetic machinery.
- to help the student to design powerful light sources for various Engineering Applications and also enable them to develop communication systems using Fiber Technology.
- to understand the working of Electronic devices, how to design acoustic proof halls and understand the behavior of the materials at Nano scale.

UNIT-I

Crystallography: Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule-Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

X-ray Diffraction & Defects in Crystals: Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

UNIT-II

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer' Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential, extension to three dimensions

Elements of Statistical Mechanics & Electron theory of Solids: Phase space, Ensembles, Micro Canonical, Canonical and Grand Canonical Ensembles - Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, Density of States, Fermi

Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

UNIT-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo - electricity and Ferro- electricity.

Magnetic Properties & Superconducting 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 and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors.

UNIT-IV

Optics: Interference-Interference in thin films (Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment , Double refraction-construction and working of Nicol's Prism

Lasers & Fiber Optics: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

UNIT-V:

Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. **Acoustics of Buildings & Acoustic Quieting** Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, factors affecting the Architectural Acoustics and their Remedies

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume

Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

TEXT BOOKS:

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

REFERENCES:

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons.
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis Ford Addison-Wesley Publishers.
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013).
4. Solid State Physics – M. Arumugam (Anuradha Publications).
5. Modern Physics – R. Murugesan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd.
8. Nanotechnology – M. Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education.

Outcomes:

- The student would be able to learn the fundamental concepts on behavior of crystalline solids.
- The knowledge on Fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so on.
- Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.
- This course also helps the student exposed to non-destructive testing methods.
- Finally, Engineering Physics Course helps the student to develop problem solving skills and analytical skills.

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(A10005) ENGINEERING CHEMISTRY**Objective:**

An engineer is as someone who uses scientific, natural and physical principles to design something of use for people or other living creatures. Much of what any engineer does involves chemistry because everything in our environment has a molecular make up. Engineering requires the concepts of applied chemistry and the more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.

UNIT I:

Electrochemistry & Corrosion: Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance (Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of P^H using glass electrode-Numerical problems.

Batteries: Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

Corrosion and its control: Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electroless plating (Ni plating) - Organic coatings – Paints - constituents and their functions.

UNIT II:

Engineering Materials: Polymers: Types of Polymerization (Chain & Step growth). **Plastics:** Thermoplastic & Thermo setting resins; Compounding &

fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon and Bakelite.

Fibers- Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers**- preparation and Applications of Poly vinyl acetate and Poly lactic acid - **Cement**: composition of Portland cement, setting & hardening of cement (reactions), **Lubricants**: Classification with examples- Characteristics of a good lubricant & mechanism of lubrication (thick film, thin film and extreme pressure) – properties of lubricants: viscosity, Cloud point, flash and fire points. **Refractories**: Classification, characteristics of a good refractory and applications.

Nanomaterials: Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

UNIT III:

Water and its Treatment: Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water**- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

Unit – IV :

Fuels & Combustion: Fuels – Classification – solid fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

Combustion – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

UNIT V:

Phase Rule & Surface Chemistry : Phase Rule: Definition of terms: Phase,

component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

Surface Chemistry: Adsorption – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

TEXT BOOKS:

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi / CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006).
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006).
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.

Outcome:

- Students will demonstrate a depth of knowledge and apply the methods of inquiry in a discipline of their choosing, and they will demonstrate a breadth of knowledge across their choice of varied disciplines.
- Students will demonstrate the ability to access and interpret information, respond and adapt to changing situations, make complex decisions, solve problems, and evaluate actions.
- Students will demonstrate awareness and understanding of the skills necessary to live and work in a diverse engineering world.

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(A10501) COMPUTER PROGRAMMING**Objectives:**

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements (making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function,

memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure, and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions, C program examples.

UNIT – V

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson

Education.

10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

Outcomes:

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CEE	L	T/P/D	C
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(A10301) ENGINEERING DRAWING**UNIT – I**

Introduction to Engineering Drawing: Principles of Engineering Drawing/ Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloid and Hypocycloid
- c) Involute.

Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

UNIT – II**Orthographic Projections in First Angle**

Projection: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projections of Points : including Points in all four quadrants.

Projections of Lines : Parallel, perpendicular, inclined to one plane and inclined to both planes. True length and true angle of a line. Traces of a line.

Projections of Planes: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – III

Projections of Solids: Projections of regular solids, cube, prisms, pyramids, tetrahedron, cylinder and cone, axis inclined to both planes.

Sections and Sectional Views: Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

UNIT – IV

Development of Surfaces: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

Intersection of Solids:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – V

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

Transformation of Projections : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

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

TEXT BOOKS

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

REFERENCES :

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing by John. PHI Learning Publisher.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CEE****L T/P/D C****- -/3/- 4****(A10581) COMPUTER PROGRAMMING LAB****Objectives:**

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week 1

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) 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.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2

- a) Write a C program to calculate the following Sum:
Sum= $1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$
- b) Write a C program to find the roots of a quadratic equation.

Week 3

a) The total distance travelled by vehicle in 't' seconds is given by distance $s = ut + 1/2at^2$ 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'.

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Week 4

- a) Write C programs that use both recursive and non-recursive functions
- To find the factorial of a given integer.

- ii) To find the GCD (greatest common divisor) of two given integers.

Week 5

- a) Write a C program to find the largest integer in a list of integers.
- b) Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices

Week 6

- a) Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to a given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

Week 7

- a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

Week 8

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

Week 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if $n < 0$, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10

- a) 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.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

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

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

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 13

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 14

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

Week 15

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

Week 16

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

- i) Create a singly linked list of integer elements.
- ii) Traverse the above list and display the elements.

Week 17

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

Week 18

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10

23 4 6 output: 10 23 4 6

Week 19

Write a C program to implement the linear regression algorithm.

Week 20

Write a C program to implement the polynomial regression algorithm.

Week 21

Write a C program to implement the Lagrange interpolation.

Week 22

Write C program to implement the Newton- Gregory forward interpolation.

Week 23

Write a C program to implement Trapezoidal method.

Week 24

Write a C program to implement Simpson method.

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers.
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CEE****L T/P/D C****- -/3/- 4****(A10081) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB****ENGINEERING PHYSICS LAB****(Any TEN experiments compulsory)****Objectives**

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various areas of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance, Spectrometer and Microscope.

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

Outcomes

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following)

Titrimetry:

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

Mineral analysis:

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:**Colorimetry:**

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

Conductometry:

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

Physical properties:

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.
12. Determination of Surface tension of lubricants.

Preparations:

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

Adsorption:

15. Adsorption of acetic acid on charcoal.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CEE

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(A10083) 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).
13. **Prescribed Lab Manual:** A Manual entitled “*English Language Communication Skills (ELCS) Lab Manual- cum- Work Book*”, published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

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.

Outcomes:

- Better Understanding of nuances of language through audio- visual experience and group activities.
- Neutralization of accent for intelligibility.
- Speaking with clarity and confidence thereby enhancing employability skills of the students.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. CEE

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(A10082) IT WORKSHOP / ENGINEERING WORKSHOP**Objectives:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware

Week 1 – Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 6 – Task 6 : Software Troubleshooting : Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Week 7 - Task 1 : Orientation & Connectivity Boot Camp : Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2 : Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 9 - Task 3 : Search Engines & Netiquette : Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Week 10 - Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Week 11- Task 5: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools**LaTeX and Word**

Week 12 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1 : Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Week 13 - Task 2: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 14 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 15 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Week 16 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 17 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and

Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 18- Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 19 - Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.

4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
II Year B.Tech. CEE-I Sem

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(A30006) MATHEMATICS - II

Objectives:

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims 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 unit aims 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 2π . 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A30203) 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, Kirchhoff'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-McGraw-Hill.
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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A30107) 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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II Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A30108) 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 -I V

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, Universities 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 Surveying, 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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II Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A30101) 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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II Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A30010) MANAGERIAL ECONOMICS AND 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A30185) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A30183) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CEE-II Sem	L	T/P/D	C
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(A40008) PROBABILITY AND STATISTICS**Objectives: To learn**

- Understand a random variable that describes 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 a 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 means 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. One sided test, Two sided test,

Large sample tests:

- (i) 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.A S.Srinivas,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.
5. Probability Theory & Stochastic Processes by P. Sri Hari, Hi-Tech Publishers.
6. Probability & Statistics by Ahmed Waheedullah, M. Ahmed Mohiuddin, Sultan Ali, HI-TECH Publishers

Outcomes:

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit 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 the industry. It is useful for all branches of engineering.
- The student would 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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CEE-II Sem	L	T/P/D	C
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(A40114) 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 subjected 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 of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd
- 2) Introduction to Strength of Materials by U.C.Jindal, Galgotia Publications Pvt. Ltd.
- 3) Strength of Materials by Bhattacharya, Cengage Learning
- 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) Strength of Materials by R.Subramanian, Oxford University Press.
- 6) Mechanics of Materials by Ferdinand P. Beer *et al.*, Tata McGraw Hill Education Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CWE-II Sem	L	T/P/D	C
	4	-/-	4

(A40111) HYDRAULICS AND HYRAULIC MACHINERY**UNIT – I**

Open Channel Flow: Types of flows - Type 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

Hydraualic 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.Grawhill 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 Mc.Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
4. Open Channel flow by V.T.Chow, Mc.Graw 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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II Year B.Tech. CEE-II Sem	L	T/P/D	C
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(A40009) 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 of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services 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 problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and

characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts 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 Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life 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.

SUGGESTED TEXT BOOKS:

- 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 BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

Outcomes:

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

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II Year B.Tech. CE-II Sem	L	T/P/D	C
	4	-/-	4

(A40115) 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 to axial load, bending moment and shear forces - Castigliano's first theorem-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses. Deflections of statically determinate bent frames.

Three Hinged Arches – Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of 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-Deflection of 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 and variable moments of inertia with one or both ends fixed-continuous beams with overhang. Effects of sinking of supports. Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and Bending moment diagrams, 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 loads, UDL longer than the span, UDL shorter than the span- Influence lines 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.

REFERENCES:

- 1) Basic Structural Analysis by K.U.Muthu *et al.*, I.K.International Publishing House Pvt.Ltd.
- 2) Structural Analysis by Hibbeler, pearson Education Ltd
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Fundamentals of structural Analysis by M.L.Gamhir, PHI.

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II Year B.Tech. CEE-II Sem	L	T/P/D	C
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(A40109) BUILDING MATERIALS, CONSTRUCTION AND PLANNING**UNIT – I**

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing Bricks – Composition of Brick earth – manufacture and structural requirements.

Wood, Aluminum, Glass and Paints: Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre – reinforced glass bricks, steel & aluminum.

UNIT-II

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

UNIT-III

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

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

UNIT -IV

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 & Bindra, Dhanpat Roy Publications

2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi

REFERENCES:

1. Building Materials by Duggal, New Age Internationals
2. Building Construction by PC Verghese PHI.
3. Construction Technology – Vol – I & II by R. Chuddy, Longman UK.
4. Basics of Civil Engg by Subhash Chander; Jain Brothers
5. Alternate Building materials and Technology, K.S.Jagadish, Venkatarama Reddy and others; New Age Publications

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II Year B.Tech. CEE-I Sem	L	T/P/D	C
	-	-/3/-	2

(A40186) COMPUTER AIDED DRAFTING OF BUILDINGS

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
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 softwares
7. Exercises on development of working of buildings

TEXT BOOKS :

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

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II Year B.Tech. CEE-I Sem	L	T/P/D	C
	-	-/3/-	2

(A40190) SURVEYING LAB – II**LIST OF EXERCISES :**

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 tacheometric 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 EQUIPMENT:

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

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III Year B.Tech. CEE-I Sem	L	T/P/D	C
	4	-/-	4

(A50116) 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 in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – II

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

UNIT – III

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspaoe 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 test, 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 and 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.Neville – Low priced Edition – 4th edition.
2. Concrete Technology by M.S.Shetty. – S.Chand & Co.

REFERENCES:

1. Concrete Technology by Job Thomas, Cengage Learning.
2. Concrete Technology by M.L. Gambhir. – 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.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CEE-I Sem

L	T/P/D	C
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(A50121) 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 of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, 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 Private 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A50119) 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 out line 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.

REFERENCES :

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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III Year B.Tech. CEE-I Sem	L	T/P/D	C
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(A50120) 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. Principals 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.Grawhill Publishers New Delhi.
5. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
6. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-I Sem**

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

(A50122) 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 wells,- 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 standards 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 Jayaram 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. Majundar, 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-I Sem****L T/P/D C****4 -/- 4****(A50117) 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 Palnetary 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 Pardeep 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 Bhawan, 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, Universiters Press, India, 2003.
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.
7. Dr. Satender , Disaster Management t 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-I Sem****L T/P/D C****4 -/- 4****(A50017) 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, Tate Mc Graw Hill Publishing company ltd.,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-I Sem****L T/P/D C****4 -/- 4****(A50018) 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 behavior 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 Savidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and 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-astitva 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-astitva) 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. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

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

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 BOOK

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. KV 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. Schumacher, 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. PL Dhar, RR 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 Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human 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. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-I Sem****L T/P/D C****- -/3/- 2****(A50181) FLUID MECHANICS & HYDRAULIC MACHINERY 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****- -/3/- 2****(A50192) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-II Sem**

L	T/P/D	C
3	-/-2	4

(A60130) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-II Sem**

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

(A60118) 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 of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of 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 Pyrite, Hematite , Magnetite, Chlorite , Galena , Pyrolusite , Graphite, Magnesite, and Bauxite.

Petrology : Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic study of 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, Out crop, strike and dip study of common geological structures associating with the rocks 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. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, land slides hazards, water in land slides 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 , minining 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-II Sem**

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

(A60133) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-II Sem**

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

(A60126) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CEE-II Sem	L	T/P/D	C
	4	-/-	4

(A60131) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CE-II Sem

L T/P/D C**4 -/- 4****(A62802) FUNDAMENTALS OF ECOLOGY****(Elective-I)****UNIT - I**

Ecology - Sustaining the Earth; Nature and Humans: Earth, population, environment.

Ecosystems; Structure and Function of eco system - Types of eco systems – Aquatic and Terrestrial eco systems - Preliminary studies of the pond, marine, grass, land and desert eco systems – Concepts of food chains and food webs.

UNIT - II

Population ecology - human population dynamics – growth and urbanization; environmental economics and politics. Urban and regional planning : Urban and regional planning based on ecological principles. Environmental issues in India like Silent valley, Chipko movement, Sardar sarovar project etc.

UNIT - III

Ecological balances – Material cycles in Ecosphere – Nitrogen, Phosphorous, Sulfur, Carbon cycles – Matter and Energy resources – Energy flow in Ecosystems – Biogeochemical cycles.

UNIT - IV

Biodiversity – Species, Genetic and Ecological diversity – Values and Benefits of biodiversity – Loss of biodiversity – Causes and Effects – Conservation of biodiversity – Endangered and Vulnerable species – Endangered species act.

UNIT - V

Ecological systems – Freshwater ecosystems – Marine ecosystems – Terrestrial ecosystems – Ecological systems and pollution – Ecological disturbances – Environmental laws to protect ecosystem

TEXT BOOKS :

1. Ecology and Environment by P.D. Sarma – Rastogi Publications.
2. Concepts of Ecology by Edward J. Kormondy – Prentice Hall Publications.

REFERENCE BOOKS:

1. Ecology and Environment by B. N. Pandey, A.P.H. Publishing Corporation.
2. Ecology Theories and Applications by Petter Stiling, Prentice Hall of India Pvt Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-II Sem****L T/P/D C****4 -/- 4****(A62801) ENVIRONMENTAL CHEMISTRY****(Elective -I)****UNIT – I**

Organic Chemistry : Concepts of physical and general chemistry - Properties of Organic Compounds, Sources of Organic Compounds, Isomerism, Types of Organic Compounds, Aliphatic, Aromatic and Heterocyclic compounds – Water and waste water chemistry – sampling and analysis – Instrumentation techniques.

UNIT – II

Concepts of Equilibrium Chemistry – Le-Chatlier's principle, Factor influencing equilibrium – Activity Coefficient- Variations of the equilibrium relationship – Oxidation Reduction reactions – Gas laws – acids and bases – buffers – solubility of salts - Action kinetics – rate of reactions – factors effecting, order of reactions – biodegradation – BOD, COD

UNIT – III

Concepts of Biochemistry – Structure of cell – Cell Biochemistry – minimal growth curve – Growth kinetics – Enzyme reactions – Functions affecting enzyme reactions – Coenzymes/ Cofactors – Temperature, pH, Macro pollutants, carbohydrates, Proteins, fats – Metabolic processes – Biological toxins – Bioaccumulation and Bio magnification – Case studies.

UNIT – IV

Growth and Production of Micro-organisms : Growth rates and Reproduction of micro-organisms, effect of chemical and physical agents on microbial growth, temperature, pH, Osmotic pressure, radiation, antibiotics, disinfectants, mutations, induced and spontaneous, destruction and removal (sterilization and disinfection) - Cell Kinetics – Energy (Aerobic and anerobic) reactions – Effects of Physical and Chemical agents on Cell control study of Protozoa, Bacteria, Viruses, Algae and fungi and their classification and significance – Enzyme Reaction.

UNIT – V

Nuclear Chemistry : Atomic Structure, Electron orbits, Neutron, Proton, Nuclear structure, Nomenclature of Isotopes, stable and radioactive nucleoids, Nature of Radiation, Energy of Radiation, Units of Radioactivity, half life, α , γ and neutron induced reaction, nuclear fission and nuclear fusion , use of radioactive materials as tracers.

TEXT BOOKS:

1. Chemistry for Environmental Engineering by Sawyer and McGraw-Hill, New York.
2. Microbiology by Pelzer, Ecschan & N R Kreig, Tata McGraw-Hill Publishers, New Delhi.
3. Microbiology for sanitary engineers by Mckinney-McGraw-Hill New York.

REFERENCE BOOK :

1. Microbiology for Scientists and Engineers by Gandy and Gandy, Tata Mc. Graw Hill Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CEE-II Sem

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

(A60128) 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-Thisis 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-II Sem**

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

(A60129) 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 Centres (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. Scarborough, PHI-2009
 11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. CEE-II Sem

L T/P/D C

- -/3/- 2

(A60194) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CEE-II Sem****L T/P/D C****- -/3/- 2****(A60086) ADVANCED COMMUNICATION SKILLS (ACS) 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. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
6. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
10. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.

11. Handbook for Technical Writing by David A McMurrey & Joanne Buckley CENGAGE Learning 2008.
12. Job Hunting by Colm Downes, Cambridge University Press 2008.
13. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
14. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
15. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
16. 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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-I Sem

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

(A70142) TRANSPORTATION ENGINEERING**UNIT I**

Highway Development and Planning: Highway development in India – Necessity for Highway Planning- Different Road Development Plans.

Highway Planning : Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports, Road Projects initiation need based planning.

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. Typical cross sections for different types of roads.

Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams. Traffic, infrastructural and safety audits.

UNIT – III

Traffic Regulation and Management: Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals –Webster Method –IRC Method, intelligent transportation systems typical architectures.

Intersection Design: Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization : Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Impacts of Geometrics on intersection with reference safety, Operational capacity

UNIT – IV

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

Geometric Design of Railway Track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs .

UNIT - V

Airport Engineering: Factors affecting Selection of site for Airport – Aircraft Characteristics- Geometric Design of Runway- Computation of Runway length – Correction for runway length – Orientation of Runway – Wind Rose Diagram – Runway Lighting system.

TEXT BOOKS:

1. Highway Engineering, S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Railway Engineering, A text book of Transportation Engineering – S.P.chadula – S.Chand & Co. Ltd. 2001
3. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
4. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.

REFERENCES:

1. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981)
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 6th Edition 1997.
3. Railway Engineering – August – Prabha & Co., 15th Edition – 1994.
4. Air Transportation Planning & design – Virendhra Kumar & Statish Chandhra – Gal Gotia Publishers 1999
5. Principles of Traffic Engineering – Garber & Hoel, Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-I Sem	L	T/P/D	C
	4	-/-	4

(A70141) SOLID WASTE MANAGEMENT**UNIT I:**

Solid Waste and their Handling: Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Problems - impact on environmental health

UNIT II:

Collection, Segregation and Transport AND Management of Municipal Solid Wastes: Handling and segregation, Collection and storage of municipal solid wastes; analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes. Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting - types, vermicomposting, termigradation, fermentation. 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 Frank Flintoff , WHO regional publications 1976.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-I Sem	L	T/P/D	C
	4	-/-	4

(A70138) ESTIMATING AND 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CEE-I Sem**

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

(A70136) AIR POLLUTION AND CONTROL**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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CEE-I Sem**

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

(A70139) INDUSTRIAL WASTE WATER TREATMENT**(Elective-II)****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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CEE-I Sem****L T/P/D C****4 -/- 4****(A72803) ENVIRONMENTAL POLLUTION OF SOIL AND REMEDIATION****(Elective-II)****Unit I**

Introduction on soil environment interaction, properties of water in relation to the porous media. Soil-three phase system, clay- the most active soil fraction.

Unit II

Water cycle with special reference to soil medium, soil behavior, soil mineralogy mineralogical characterization - soil-water interaction, diffuse double layer models, force of attraction and repulsion, soil –water contaminant interaction.

Unit III

Ion exchange methods – softening, aeration & adsorption techniques – defluoridation – removal of iron, lead, arsenic, manganese, influence of organic and inorganic chemical interaction.

Unit IV

Introduction to unsaturated soil contamination, sources of contamination, water retention property and soil water characteristics - Concepts of waste contaminant facilities- desirable properties of soil – contaminant transport and retention.

Unit V

Soil modification by environmental changes, stabilization of soil by environmental changes, use of additives and their basic mechanisms - Introduction to advanced soil characterization techniques, volumetric water content, electrical and thermal properties, pore-size distribution.

TEXT BOOKS:

1. Soil Pollution by Dr. S.G. Misra and Dinesh Mani – A.P.H. Publishing.
2. Introduction to Environmental Geotechnology by Fang, H-Y, CRC Press.
3. Waste Contaminant Systems by Sharma H.D. et.al, John- Wiley and Sons Inc.
4. Geoenvironmental Engineering – Principles and Applications by Reddi, L.N. and Inyang H.F., Marcel Dekker Inc.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-I Sem

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

(A70145) 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 afforestation.

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CEE-I Sem**

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

(A72804) ENVIRONMENTAL SANITATION**(Elective-III)****UNIT - I**

Epidemiology – Principles of protecting the environmental sanitation measures, Insect and Rodent Control – Occupational hazards, Industrial hygiene, Rural Water Supply and sanitation, biogas.

UNIT – II

Sanitation - community sanitation measures – sanitation of camps, festivals, schools, swimming pools etc. Food and milk sanitation, hotel management with reference to sanitation – food preservation, pasteurization methods and plants. Housing need – lighting and ventilation, natural and artificial provisions.

UNIT - III

Solid wastes – characteristics, collection, disposal by landfill, composting, incineration and other methods.

Handling and disposal of Hazardous Wastes. Industrial Hygiene – Occupational hazards – Various operations in industrial units, Engineering and safety measures. Radiological health – radioactive wastes and disposal.

UNIT - IV

Noise Pollution and control – Introduction, Measurement of noise, Effects of noise and control measures.

UNIT - V

Rural sanitation various methods of collection and disposal of fecal matter – community toilets – septic tanks and soak pits – biogas plants - Public Health – Aspects of slums – Problems associated with slum rehabilitation.

TEXT BOOKS :

1. Municipal and Rural Sanitation by Eulers and Steel, Tata McGraw-Hill Publishing Co., New Delhi.
2. Environmental Sanitation by Salvato – John Wiley & Sons.
3. Environmental Protection by Chanlet- McGraw-hill New York.
4. Environmental Sanitation by Baljeet S. Kapoor, S. Chand & Co., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CEE-I Sem****L T/P/D C****4 -/- 4****(A70330) FINITE ELEMENT METHODS****(Elective-III)****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 isoparametric 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 BOOK:

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-I Sem

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

(A70140) REMOTE SENSING & GIS**(Elective –III)****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 fiducial 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-I Sem

L	T/P/D	C
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(A70195) CONCRETE AND 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)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-I Sem

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

(A70191) 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 a Geological map along with a geological section.
4. Simple strike and Dip problems.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CEE-II Sem****L T/P/D C****4 -/- 4****(A80124) ENVIRONMENTAL IMPACT ASSESSMENT****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, Salinisation, 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, Considerations, 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, Gol.
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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-II Sem	L	T/P/D	C
	4	-/-	4

(A80146) 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,998.
3. Punmia,B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, new delhi,1987.

REFERENCES:

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

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IV Year B.Tech. CEE-II Sem

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

(A80127) GROUND IMPROVEMENT TECHNIQUES**(Elective – IV)****UNIT – I**

Introduction to Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterise 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-II Sem	L	T/P/D	C
	4	-/-	4

(A82805) GROUND WATER POLLUTION**(Elective-IV)****UNIT – I**

Ground water Contamination and Transport, Ground Water remediation, Sources and Types of Ground water contamination

UNIT – II

Under Ground storage Tanks, Land fills, surface impoundment's, Waste disposal Injection wells Septic systems, Agricultural wastes, land applications, Radioactive contamination, other sources of contaminants, Data-collection methods: Introduction, Geological data acquisition, and hydrologic data acquisition, acquisition of soil and ground water quality data.

UNIT – III

Contaminant transport Mechanisms: Introduction, advection processes, diffusion and dispersion processes, Mass- transport equations, one dimensional model, Governing flow and transport equation in two dimensions, semi-analytical methods, test for dispersivity, Natural gradient field test for dispersion.

UNIT –IV

Sorption and other Chemical Reactions: Introduction, the concept of sorption, factor influencing sorption, sorption Isotherm, Hydrophobic theory for organic contaminant's

UNIT – V

Sorption effects on fate and transport of pollutants, Estimation of sorption, Redox reaction, Hydrolysis, volatilization, Acid-Base reaction, Ion exchange, dissolution and precipitation of solids, complication reaction, models incorporating chemical reactions.

TEXT BOOKS:

1. Ground water contamination (Transport and remediation) - Philip.B.Bedient, Hanadi.S. Rifai & Charles.J.Newell Publishers: Prentice Hall Publishers.
2. Ground Water Hydrology by Devid Keith Todd, John Wiley & Sons.

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IV Year B.Tech. CEE-II Sem	L	T/P/D	C
	4	-/-	4

(A82806) WATER QUALITY MANAGEMENT**(Elective-IV)****Unit -I**

Introduction – Water Quantity purification – Water sampling Analysis – Monitoring in rivers. Pollution of Surface water : Sources – Effects on receiving waters- Control of NPS Pollution – Approaches.

Unit – II

Modeling Pollutants – Self purification of rivers DO models, Critical deficit and time required to reach the critical deficit. Lake Water Quality Management: Effect of pollutants – Stratification of lakes – Problem in Urban Lakes – Eutrophication – Restoration Techniques.

Unit III

Groundwater pollution and management- Sources of ground water pollution and their effects- municipal, industrial, agricultural and miscellaneous, ground water basin investigations. Groundwater modeling techniques.

Unit – IV

Introduction to Urban storm water quality management – Estimation of runoff – Pollutants in urban run off – storm water treatment facilities. Rain Water harvesting – Ground water re-charge – Estimation –Roof top water collection systems – re-charge techniques – soak points.

Unit V

Watershed Management- concept of watershed – objectives, Runoff estimation – rainwater harvesting Methods – check dams, artificial re-charge, farm ponds, percolation tanks.

TEXT BOOKS:

1. Water Quality by Vladimar Novotny- John Wiley & Sons, Inc.
2. Water Supply and Sanitary Engineering by G.S. Birde- Dhanpath Rai Publishing Company Pvt, Ltd., New Delhi.
3. Ground Water Hydrology by David Keith Todd- John Wiley & Sons.
4. Watershed Management by N.D. Mani – Dominant Publishers and Distributors.

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IV Year B.Tech. CEE-II Sem	L	T/P/D	C
	-	-/-	2

(A80087) INDUSTRY ORIENTED MINI PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-II Sem	L	T/P/D	C
	-	-/6/-	3

(A80089) SEMINAR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-II Sem	L	T/P/D	C
	-	-/15/-	10

(A80088) PROJECT WORK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CEE-II Sem	L	T/P/D	C
	-	-/-	2

(A80090) COMPREHENSIVE VIVA

