



ANURAG ENGINEERING COLLEGE

(AN AUTONOMOUS INSTITUTION)

Ananthagiri(V) Kodad(M) Nalgonda(Dt) 508 206..

Academic Regulations - for B. Tech (Regular)

(Effective for the students admitted into I year from the Academic Year **2014-2015** onwards)

1. Award of B.Tech. Degree

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

- i. Pursued a course of study for not less than four academic years and not more than eight academic years.
- ii. Register for 200 credits and secure 200 credits

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course.

3. Courses of study

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

Branch Code	Branch
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- | | |
|------|---|
| I. | Civil Engineering |
| II. | Electrical and Electronics Engineering. |
| III. | Mechanical Engineering. |
| IV. | Electronics and Communication Engineering |
| V. | Computer Science and Engineering. |

and any other course as approved by the authorities of the College from time to time.

4. Credits

	For I Year – I/II semester		II, III, IV years per Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03	03	03	03
	02	02	04	04
Practical	03	02	03	02
Drawing	03T/03D	03	03	02
			06	04

Mini Project	--	--	--	02
Comprehensive Viva Voce	--	--	--	02
Seminar	--	--	6	02
Project	--	--	15	10

5. Distribution and Weightage of Marks

- i. The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar, comprehensive viva-voce and project work shall be evaluated for 50, 50,100 and 200 marks respectively.
- ii. For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.
- iii. For theory subjects, during the semester there shall be 2 midterm examinations. Each mid term examination consists of Part-A (Short Answer) for 5 marks and Part-B (subjective paper) for 15 marks with duration of 90 Minutes and one assignment carrying 5 marks.

Subjective paper shall contain 3 questions with internal choice, each question carries 5 marks. First mid term examination shall be conducted for 2.5 units of syllabus and second mid term examination shall be conducted for 2.5 units. First Assignment should be submitted before the conduct of the first mid, and the second Assignment should be submitted before the conduct of the second mid.

The total marks secured by the student in each mid term examination for 25 marks is considered and the average of the two mid term examinations shall be taken as the final marks secured by each candidate. If he/she is absent for any test / assignment, he/she is awarded zero marks for that test / assignment.

- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with one external examiner and one internal examiner. The external examiner shall be appointed from the panel of examiners as recommended by Chairman, Board of Studies in respective Branches.

- v. 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 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.
- vi. 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 in IV year I Semester. The industry oriented mini project shall be submitted in report form and should be presented before the committee, which shall be evaluated for 50 marks. The committee consists of an external examiner, head of the department, the supervisor of mini project and a senior faculty member of the department. There shall be no internal marks for industry oriented mini project.
- vii. 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 over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.
- viii. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he / she 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.
- ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the committee. The committee consists of an external examiner, head of the department, the supervisor of project and a senior faculty member of the department. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall be conducted 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.

6. Attendance Requirements:

- i. A student shall be eligible to appear for the end examinations if he / she acquires a minimum of 75% of attendance in aggregate of all the subjects.
- ii. Condonation of shortage of attendance in aggregate up to 10% (on genuine medical grounds) in each semester may be granted by the College Academic Council on the basis of recommendation by the principal.
- iii. Shortage of Attendance below 65% in aggregate shall in NO case be condoned
- iv. Students falling short of attendance as specified above will be detained.
- v. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.
- vi. Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
- vii. A stipulated fee decided by the Academic Council shall be payable towards condonation of shortage of attendance.

7. Minimum Academic Requirements:

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

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.
- ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of
Rule (I): 30 credits (out of 75 credits) secured from all the exams (both regular and supplementary) conducted up to end of II year, excluding the performance in II – B.Tech – II – Semester examination.

(OR)

Rule (II): 40 credits (out of 100 credits) secured from all the exams (both regular and supplementary) conducted up to end of II year, including the performance in II – B.Tech – II – Semester examination.

- iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of

Rule (I): Total 50 credits (out of 125 credits) secured from all the exams (both regular and supplementary) conducted up to end of III year, excluding the performance in III – B.Tech – II – Semester examination.

(OR)

Rule (II): 60 credits (out of 150 credits) secured from all the exams (both regular and supplementary) conducted up to end of III year, including the performance in III – B.Tech – II – Semester examination.

- iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.
- v. Students who fail to earn 200 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern:

- i. The entire course of study is of four academic years. All years shall be on semester pattern.
- ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination.
- iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester is offered after fulfilment of academic regulations.

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 for the best 200 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 in internal evaluation and end examination shall be shown separately in the marks memorandum)

10. Minimum Instruction Days:

For each semester there shall be 90 clear instruction days.

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

12. General:

- i. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- ii. **The academic regulation should be read as a whole for the purpose of any interpretation.**
- iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.
- iv. The COLLEGE may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the COLLEGE.

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

(Effective for the students getting admitted into II year from the Academic Year 2015-2016 and onwards)

1. The Students have to acquire 150 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree.
Register for **150** credits and secure **150** credits.
2. Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.
3. The same attendance regulations are to be adopted as that of B. Tech. (Regular).
4. **Promotion Rule:**

A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of

Rule (I) : 30 Credits (out of 75 credits) secured from all the exams (both regular and supplementary) conducted upto end of 3rd year, excluding the performance in III-B.Tech-II-Sem Exam.

OR

Rule (II) : 40 Credits (out of 100 credits) secured from all the exams (both regular and supplementary) conducted upto end of 3rd year, including the performance in III-B.Tech-II-Sem Exam.

5. **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:

First Class with Distinction	70% and above	From the aggregate marks secured for 150 Credits. (i.e. II year to IV year)
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 in internal evaluation and end examination shall be shown separately in the marks memorandum)

6. All other regulations as applicable for B. Tech. Four-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. The Hall Ticket of the candidate is to be cancelled.
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)

		<p>already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all END 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.</p>
4.	<p>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.</p>	<p>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. The candidate is also debarred for two consecutive semesters from class work and all END examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</p>
5.	<p>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.</p>	<p>Cancellation of the performance in that subject.</p>
6.	<p>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 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</p>	<p>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. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.</p>

	<p>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.</p>	
7.	<p>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</p>	<p>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. The candidate is also debarred for two consecutive semesters from class work and all END examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</p>
8.	<p>Possess any lethal weapon or firearm in the examination hall.</p>	<p>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. The candidate is also debarred and forfeits the seat.</p>
9.	<p>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.</p>	<p>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. The candidate is also debarred and forfeits the seat.</p> <p>Person(s) who do not belong to the College will be handed over to police and, a police case will be registered</p>

		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.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the PRINCIPAL/DIRECTOR for further action to award suitable punishment.	

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I YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
A51001	English-I	2	0	2
A51002	Mathematics - I	3	1	3
A51003	Engineering Physics-I	2	1	2
A51004	Applied Chemistry-I	2	1	2
A51005	Computer Programming - I	3	1	3
A51006	Engineering Graphics-I	2	3	3
A51007	Engineering Mechanics - I	2	1	2
A51201	Computer Programming – I Lab	0	3	2
A51202	English Language Communication Skills Lab-I	0	3	2
A51203	Engineering Physics and Applied Chemistry Lab-I	0	3	2
A51204	Engineering Workshop-I	0	3	2
	Total	16	20	25

I YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	Lectures	T/P/D	Credits
A52001	English – II	2	0	2
A52002	Mathematics - II	3	1	3
A52003	Engineering Physics-II	2	1	2
A52004	Applied Chemistry-II	2	1	2
A52005	Engineering Mechanics - II	2	1	2
A52006	Computer Programming - II	3	1	3
A52007	Engineering Graphics - II	2	3	3
A52201	English Language Communication Skills Lab-II	0	3	2
A52202	Engineering Physics and Applied Chemistry Lab-II	0	3	2
A52203	Engineering Workshop-II & IT Work shop	0	3	2
A52204	Computer Programming – II Lab	0	3	2
	Total	16	20	25

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

T – Tutorial

P – Practical

D – Drawing

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I Year B.Tech. CE – I Sem

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English-I

1. 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.*

2. OBJECTIVES:

- a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
- b. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- c. To develop the study skills and communication skills in formal and informal situations.

LEARNING OUTCOMES:

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

SYLLABUS:

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:

For Detailed study:

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

For Non-detailed study:

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

UNIT –I

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

2 hrs

L-Listening For Sounds, Stress and Intonation	1
S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)	1
R- Reading for Subject/ Theme	1
W- Writing Paragraphs	1

UNIT –II

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

3

hrs

G-Types of Nouns and Pronouns	1
V- Homonyms, homophones synonyms, antonyms	2

UNIT-III

Chapter 3: “**Cyber Age**” from “Skills Annexe -Functional English for Success” Published by Orient Black Swan, Hyderabad.

2

hrs

L – Listening for themes and facts	1
S – Apologizing, interrupting, requesting and making polite conversation	1
R- For theme and gist	1
W- Describing People, Places, Objects, Events	1

UNIT-IV

Chapter 4:‘**Three Days To See**’ from “Epitome of Wisdom”, Published by Maruthi Publications, Hyderabad

2 hrs

G- Verb forms	2
V- noun, verb, adjective and adverb	2

UNIT-V

Chapter 5 '**Risk Management**' from "Skills Annexe -Functional English for Success"

Published by Orient Black Swan, Hyderabad

2 hrs

L – for main points and sub-points for note taking	1
S – giving instructions and directions; Speaking of hypothetical situations	1
R – reading for details	1
W – note-making, information transfer, punctuation	1

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

**ANURAG ENGINEERING COLLEGE
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I Year B.Tech. CE – I Sem

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**MATHEMATICS-I
(Calculus and Matrices)**

Course Objectives:

1. Able to know the Mean value theorems and determine the maxima and minima for function of several variables.
2. Concepts of matrix algebra, methods of solving system of linear equations.
3. Determine eigen values and eigen vectors of a matrix, Cayley Hamilton theorem and inverse by Cayley Hamilton theorem
4. Develop a strategy for finding a solution of given arbitrary differential equation, using different methods.
5. Understand the sol of higher order differential equations, application of ODE in Bending of beams, electrical circuits and simple harmonic motion.

UNIT-I: Functions of Single Variable and Functions of several variables

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) – Geometrical interpretation of Mean value theorems. Functions of several variables – Partial Differentiation and total differentiation - Functional dependence-Jacobian Determinant- Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT-II: Matrices and Linear System of Equations

Matrices and Linear systems of equations: Real matrices – Symmetric, skew - symmetric, orthogonal, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew – Hermitian and Unitary. Elementary row transformations-Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods (Gauss Elimination, Gauss Jordan).

UNIT-III: Eigen Values and Eigen Vectors

Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonalization of matrix.

UNIT-IV: Differential Equations of first order and their Applications

Differential equations of first order and first degree: exact, linear and Bernoulli, Applications to Newton's law of cooling, law of natural growth and decay, orthogonal trajectories.

UNIT-V: Higher Order Linear Differential Equations and their Applications

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

Course Outcomes:

1. Understand Rolle's and the Mean value theorems and to verify the Mean value theorems
2. Apply partial derivatives to study maxima and minima of functions of two variables
3. Define rank and elementary transformations of a matrix.
4. Discuss Non homogeneous and homogeneous system of equations.
5. Compute eigen values and corresponding eigen vectors of a square matrix.
6. Specify standard methods for solving differential equations and their applications in geometrical and physical problems.
7. Identify different types of higher order differential equations and their applications in engineering problem solving.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
2. Shahanaz Bathul (2007), Engineering Mathematics-I, 3rd Edition, Hyderabad, Right Publishers.
3. Ramana B.V (2010), Engineering Mathematics, New Delhi, Tata McGraw Hill Publishing Co. Limited
4. Mathematical Methods: S.R.K. Iyengar and R.K. Jain, Narosa Publishing House. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti .Datta (2012), Seventh E

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ENGINEERING PHYSICS – I

Course objectives:

1. Emphasize the study of interference, diffraction and create an ability to design and conduct experiments like diffraction grating.
2. To impart the knowledge of mathematics and science to determine the crystal structures of various systems.
3. Having knowledge of classical and quantum statistics of distribution, the study of behavior of particles in large number is possible.
4. Impart the importance of magnetic materials and super conductors and their applications.
5. To enable the students to know about the influence of electric field on dielectric materials and thereby solve the problems relating the topic.

UNIT - I

INTERFERENCE AND DIFFRACTION:

10

Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment (Qualitative), interference in thin films by reflection, Newton's rings Experiment, Distinction between Fraunhofer and Fresnel diffraction, Diffraction at single slit, Diffraction grating (Qualitative), Introduction to polarization, Brewster's law and Double refraction.

UNIT - II

CRYSTAL STRUCTURES:

05

Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices, Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals.

DIRECTIONS, PLANES AND X-RD:

05

Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems – Diffraction of X-rays by crystal planes and Bragg's law – Powder method – Applications of X-ray diffraction.

UNIT - III

ELEMENTS OF STATISTICAL MECHANICS:

08

Introduction, Phase space, Definition of Ensembles, Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics – Photon gas – Planck's law of black body radiation – Deduction of Wien's law and Rayleigh-Jeans law from Planck's law.

UNIT – IV

MAGNETIC PROPERTIES :

08

Introduction – Basic definitions - Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – properties of Anti ferro and Ferri magnetic materials .

SUPERCONDUCTIVITY: Introduction, Meissner effect – Critical fields, Type I and Type II superconductors-Applications of super conductors.

UNIT - V

DIELECTRIC PROPERTIES:

09

Electric dipole, Dipole moment, Dielectric constant – Parallel plate Capacitor, Electronic, Ionic and Orientation Polarization – Calculation of Polarizibilities – Internal fields – Claussius – Mossotti equation – Basic concepts of Piezo, Pyro and Ferro electricity.

Course Outcomes:

1. Finally the students may be familiar with the topics of crystals, dielectrics, optics etc... which will be useful in various branches of technology.
2. There will be a chance for them use the subject as a mathematical tool to solve their real life problems.

TEXT BOOKS:

1. Engineering Physics by P K palanisamy :Sciotech publication
2. Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

1. Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
2. Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
3. Engineering Physics by V Rajendran; McGraw hill education private ltd.
4. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand
5. Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers
6. Engineering Physics by M.R.Srinivasan, New Age Publishers

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APPLIED CHEMISTRY – I

Course objectives:

1. To appraise the students about the importance and role of chemistry in the field of Engineering by explaining the relevant topics.
2. To enable students to apply the knowledge acquired in improving the properties of engineering materials.
3. To provide the students with the necessary knowledge to solve the problems and make decisions with regards to the application of materials in a variety of engineering disciplines.
4. To equip the students with the required fundamentals of engineering chemistry to carry out in the interdisciplinary research such that the findings benefit the common man.
5. After the completion of the course, the student would understand about the important chemistry of water, electrochemistry, batteries and surface chemistry.

UNIT I : WATER TECHNOLOGY

Hardness of water, expression of hardness, units and types of hardness. Estimation of temporary & permanent hardness of water by EDTA method. Numerical problems. Potable water, characteristics, treatment of water for domestic supply. Desalination of brackish water : reverse osmosis. Alkalinity of water. Boiler troubles:-priming and foaming, boiler corrosion, scales, sludges and caustic embrittlement. Boiler feed water and its treatment: Internal treatment :colloidal, phosphate calgon conditioning . External treatment: zeolite process and ion –exchange process. Numerical problems.

UNIT II: ELECTROCHEMISTRY

Conductance-types (electronic and electrolytic), Types of electrolytic conductance: specific, equivalent and molar conductance, Kohlrausch's law and its applications. Electrode, electrode potential, galvanic cell, cell reactions and cell notation, cell EMF, electrochemical series & its applications, types of electrodes (Normal Hydrogen Electrode, calomel electrode, glass electrode and quinhydrone electrode), Nernst equation and its applications, numerical problems. Potentiometric titrations. Concentration cells, classification with examples.

UNIT III: BATTERIES

Introduction to cell and battery, characteristics of a cell. Primary (dry cell and lithium cell) and secondary cells, (lead-Acid cell, Ni-Cd cell and Lithium ion cells,). Engineering applications of batteries, Solar battery, Fuel cells – Hydrogen – Oxygen fuel cell, Methanol -Oxygen fuel cell and advantages and engineering applications of fuel cells.

UNIT IV: CORROSION AND ITS CONTROL:

Corrosion and its types: chemical and electrochemical corrosion, mechanism of chemical and electrochemical corrosion, galvanic, water line and pitting corrosion, factors affecting the rate of corrosion: nature of the metal, galvanic series, purity of metal, nature of corrosion product, nature of environment: effect of temperature, effect of pH, humidity. Corrosion control methods: Cathodic protection: sacrificial anode method and impressed current cathode method. Protective coatings: metallic coatings, anodic and cathodic, methods of application on metals, hot dipping (galvanizing), cladding, cementation, electroplating (of copper), electroless plating (of nickel) Organic coatings – paints, its constituents and their functions.

UNIT V: SURFACE CHEMISTRY:

Adsorption, types - physical and chemical adsorption, Langmuir adsorption isotherm, application of adsorption, Colloids, classification of colloids, Electrical, mechanical & optical properties of colloids applications of colloids in industry. Micelles- Introduction, formation, structure, critical micellar concentration, uses. Nano materials: Introduction, basic methods of preparation (co-precipitation method, chemical vapour deposition method and sol gel method) and applications of nano materials.

Course Outcomes:

1. Industrious Students and health conscious ones remain inquisitive on potable water its parameter and usage.
2. Dynamic students indeed capable of explaining the various aspects of electro chemistry work out numerical problems.
3. Thorough with cells and solar, fuel cells
4. Gets augmented to the caliber in knowing corrosion and causes going around and capable of suggesting periodical maintenance.
5. Archetypal students comprehend the applications of colloids in various fields in exhort their immense significance.

TEXT BOOKS:

1. Engineering Chemistry by NYS.Murthy, Pearson, India.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company

REFERENCE BOOKS:

1. Text Book of Engineering Chemistry by Shasi Chawla, Dhantpat Rai publishing Company,
2. Engineering Chemistry by C.Daniel Yesudian, Anuradha publications

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COMPUTER PROGRAMMING - I

Course Objectives:

1. To explain representation of numbers, alphabets and other characters in computer system
2. To understand the basic concepts in C Programming Language
3. To explain software development tools like algorithm, pseudo codes and programming structure.
4. To explain selection and repetition statements in 'C' Language
5. To explain arrays to solve problems
6. To explain strings and string operations
7. To learn how to write modular programming in 'C' Language.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, operating system functions, language processor concepts.

Overview of C Language : Program structure and simple programs using scanf and printf functions.

Data representations- Binary, octal, hexa number systems, ASCII and EBCDIC, data types, Identifiers, Variables, Constants, declarations.

UNIT - II

Operators, Expressions, Precedence and Associativity, evaluation of expressions, sample programs using expressions, Type conversions, unformatted I/O.

Algorithms- control structure – grouping, selectors, repetitions.

Step wise refinement, flowchart.

UNIT - III

Statements- Selection Statements – if and switch statements, algorithm and program example using selectors.

Repetition statements (loops)-while, for, do-while statements, algorithm development using repetition and programs using repetition, break, continue, goto, exit, Simple C Program examples.

UNIT - IV

Arrays – Introduction, declaration, reading and printing arrays , programs using arrays, two – dimensional arrays,

Multidimensional arrays, C program examples.

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

UNIT – V

Functions- procedural abstraction, function declarations, function calls and parameter passing, Standard functions, Storage classes- recursion- recursive functions, example C programs.

Course Outcomes:

Upon completion of this course the students will have an:

1. Ability to design algorithmic solutions to problem
2. Ability to convert algorithms to C-Programs
3. Ability to write, compile and debug programs in C Language
4. Ability to write Programs using selection and repetition statements
5. Ability to write programs using Arrays and Strings
6. Ability to design structured programming.

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.

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ENGINEERING GRAPHICS – I

Course Objectives:

1. To visualize and communicate geometrical elements like Polygons, Curves, Conic Sections, Cycloids and Involutives
2. To understand the fundamentals of geometry like Plane, Diagonal and Vernier Scales and its applications in design and manufacturing of various engineering components.
3. To understand the fundamentals of geometry like Polygons and Involutives and its applications in design and manufacturing of various engineering components.
4. To understand the fundamentals of geometry like Planes and its applications in design and manufacturing of various engineering components.
5. To understand the fundamentals of geometry like Solids and its applications in design and manufacturing of various engineering components.

UNIT – I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, use of pencils, Lettering, Rules of dimensioning.

Construction of polygons Practice only.

Curves used in Engineering Practice and their Constructions.

Conic Sections: Ellipse, Parabola, Hyperbola including the Rectangular Hyperbola - General method only.

Cycloidal curves - Cycloid, Epicycloid and Hypocycloid

UNIT – II

Introduction to Scales: Construction of Plain, Diagonal, and Vernier Scales.

Involutives of Circle & Regular Polygons.

UNIT – III

Drawing of Projections or Views (Orthographic Projection in First Angle Projection Only): Principles of Orthographic Projections – Conventions – First and Third Angle Projections, Projection of Points, Projection of Lines - inclined to both planes, True lengths. (**Traces, Mid points** can be removed)

UNIT – IV

Projections of Planes: Projections of regular Planes, traces, Projections of Planes on Auxiliary planes.

UNIT – V

Projections of Solids: Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes – Change of position and Auxiliary plane method.

Course Outcomes:

1. To know the importance of Engineering Graphics and to represent the various Curves, Conic Sections, and Cycloids used in Engineering Graphics.
2. To Draw and understand the Construction of Plane, Diagonal and Vernier Scales used in Engineering Graphics and also represent the Construction of Polygons and Involutives.
3. To Draw and understand the Principles involved in Orthographic Projections and to represent the Principles involved in Points, Lines and Traces.
4. To Draw and understand the construction Principles involved in Planes.
5. To Draw and understand the construction Principles involved in Solids.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing, K.L.Narayana and Kannaiah / Sciotech publishers.

REFERENCES:

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.
2. Engineering Drawing, Basant Agarwal, TMH

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ENGINEERING MECHANICS – I

Course Objectives:

1. To apply the knowledge of mechanics for engineering problems
2. To develop an understanding of the principles of statics bodies.
3. To analyse the bodies with applications of friction.
4. To develop the geometric shapes for composite sections
5. To develop the moment of inertia of the geometric shapes for composite sections

UNIT-I

Introduction to Engineering Mechanics - Basic Concepts

System of Forces: Coplanar Concurrent Forces - Components in Space - Resultant - Moment of Force and its Application - Couples and Resultant of Force Systems.

UNIT-II

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar and Spatial System of forces. Lamé's Theorem.

UNIT-III

Friction: Basic concepts, Types of Friction, cone of friction, Applications of Friction: Wedge friction, Screw friction and Belt friction

UNIT-IV

Centroid: Centroids of simple figures (from basic principles) Centroids of Composite Figures.

Centre of Gravity: CG of simple bodies (from basic principles), CG of composite bodies, Pappus theorem.

UNIT - V

Area Moment of Inertia: Definition - Polar Moment of Inertia, Transfer Theorem, MI of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: MI of Masses, Transfer Formula for MMI, MMI of composite bodies.

Course Outcomes:

1. To introduce the basic principles of mechanics applicable to rigid bodies in equilibrium.
2. Construct free body diagrams and develop appropriate equilibrium equations.
3. Analyse the systems with friction.
4. Determine the centroid and centre of gravity for composite areas.
5. Determine the moment of inertia for composite areas

TEXT BOOKS:

1. Engineering Mechanics by Ferdinand. L. Singer
2. Engineering Mechanics by S.S.Bhavikatti J.G.Rajasekharappa.

REFERENCE BOOKS:

1. Engineering Mechanics by Timoshenko & Young.
2. Engineering Mechanics by Meriam and Kraize
3. Engineering Mechanics by K.L.Kumar / Tata McGraw Hill.
4. Engineering Mechanics by A. K. Tayal.

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COMPUTER PROGRAMMING – I LAB

Course Objectives:

1. To make the student learn Linux commands
2. To make the student learn a programming language
3. To teach the student to write programs in C to solve the problems
4. To make the student to write the programs using control statements
5. To make the student to use arrays for solving the problems
6. To make the student to write modular programming

Week 1:

1. Familiarity with Linux Commands – Login, Wild Chars, ls, cp, mv, mkdir, wc, chdir.
2. Creation of text files using vi editor.

Week 2:

Using vi editor – perform operations of pattern search, insertion, deletion and substitution operations

Week 3:

Write simple programs using scanf and printf functions and familiarity with format strings.

Week 4 & 5:

Write programs to illustrate the Assignment Operators

Week 6:

Write programs to illustrate the Logical Operators

Week 7:

Write programs to illustrate the Relational Operators

Week 8:

Write programs using If Statement

Week 9:

Write programs using while, do-while loops

Week 10:

Write programs using for loop

Week 11:

Write programs to illustrate one dimensional arrays

Week 12:

Write programs to illustrate two dimensional arrays

Week 13:

Write programs to illustrate String concepts.

Week 14:

Write programs using functions

Week 15:

Review

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.

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English Language Communication Skills Lab-I

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

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

Learning Outcomes:

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

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

Exercise-II

ICS Lab: Ice-Breaking activity and JAM session
Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise-III

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

Exercise-IV

ICS Lab: Situational Dialogues -Role-Play- Self-introduction and introducing others- Greetings- Apologies- Requests.

Exercise-V

ICS Lab: Social and Professional Etiquette and Telephone Etiquette-Tenses-Non-Verbal Communications.

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. **Strengthen Your Steps** - Dr. M. Hari Prasad and others, Maruthi Publications
3. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
5. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
6. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
7. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
8. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
9. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi : Foundation
10. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
11. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
12. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
13. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
14. **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.

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ENGINEERING PHYSICS AND APPLIED CHEMISTRY LAB - I

Engineering Physics Lab:

Any Five Experiments from the following:

1. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
2. Melde's experiment
3. Newton's Rings
4. Dispersive Power of the material of a Prism using Spectrometer
5. Stewart & Gee's experiment
6. LED Characteristics
7. LASER Characteristics
8. Diffraction Grating with laser source

APPLIED CHEMISTRY LAB – I:

Course objectives:

1. To impart fundamental knowledge in handling the equipment /glassware and chemicals in
the chemistry laboratory .
2. To offer hands on experience on the basic equipment related to engineering chemistry.
3. For practical understanding of theoretical concepts of chemistry.

Number of periods = 3 periods in two weeks per batch

Perform any seven experiments:

1. Fundamentals of volumetric analysis : Determination of strength of an acid (HCl)
2. Estimation of ferrous iron by dichrometry
3. Estimation of hardness of water by EDTA method.

4. Determination of iron by permanganometry.
5. Determination Surface Tension of lubricants.
6. Determination of alkalinity of water.
7. Determination of total dissolved solids in water.
8. Determination of free chlorine or chlorides in water.
9. Determination of reactivity of given metals
10. Determination of the rate constant of acid catalyzed hydrolysis of methyl acetate.

TEXT BOOKS:

1. Fundamentals of physics-D. Halliday , R.Resnick & John Wiley.
2. Optics- A. Ghatak,Tata Magrawhill.
3. Practical physics- GL Squires.
4. Vogel's Textbook of Quantitative Chemical Analysis
5. Essentials of experimental engineering chemistry , Shashi Chawla, Dhanpat Rai & Co
6. Laboratory manual of engineering chemistry, S.K.Bhasin and Sudha Rani, Dhanpat Rai & Co.

REFERENCE BOOKS:

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

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ENGINEERING WORKSHOP – I

Course Objectives:

1. To impart the knowledge regarding the various techniques, skills and tools necessary for engineering workshop practice.
2. To provide the students with hands on experience on different trades of engineering workshop like black smithy, foundry and welding.
3. To learn about the machines in view of constructions details, different operations to be performed on the machines and different tools.
4. To enhance the practical approach towards machine tools.
5. To introduce the concepts of power tools in constructions , wood working, electrical engineering and mechanical engineering in manufacturing applications

1. TRADES FOR EXERCISES:

At least THREE exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-smithy and development of jobs carried out and soldering.
4. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine shop

Course Outcomes:

1. To make a lap joint
2. To make a dovetail- joint
3. To make a T-bridle joint
4. To prepare a flat filing
5. To prepare a step cutting
6. To prepare a angular cutting
7. To prepare a open scoop
8. To prepare a rectangular tray
9. To prepare a square tin

10. To understand and to give the connections for one light point control by one single pole switch .
11. To understand and to give the connections for one light point control by two-two way switches (parallel connections)
12. To understand and to give the connections for to-connect a electrical bell by using bell push
13. To understand and to give the connections for two light point controlled by one single pole switch.
14. To prepare a pipe joint , tap- connections by using plumbing
15. To apply different operations to be performed on the lathe machines.

TEXT BOOKS:

1. Work shop manual - P.Kannaiah/K.L Narayana/scitech publishers.
2. Workshop manual by Venkat Reddy

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MATHEMATICS-II
(Mathematical Techniques)

Course Objectives:

1. To introduce some special functions like Gamma, Beta and learn how to evaluate definite integrals with the help of special functions.
2. Able to know the Laplace , Inverse Laplace transform and sol of ODE by using Laplace transforms
3. Evaluate the multiple integrals and analyze the DEL properties.
4. Apply the theorems by using line, surface and volume integrals
5. Determine the Fourier coefficients of a given function. Analyze the characteristics and properties of Fourier transforms

UNIT-I: Laplace transform and its applications to Ordinary differential equations

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

UNIT-II: Gamma and Beta Functions:

Gamma and Beta Functions-Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

UNIT – III: Multiple Integrals

Multiple integrals - double and triple integrals – change of order of integration- change of variables. Gradient- Divergence- Curl and their related properties - Potential function - Laplacian and second order operators.

UNIT-IV: Vector Calculus

Line integral – work done — Surface integrals - Flux of a vector valued function. Vector integrals theorems: Green's – Stoke's and Gauss's Divergence Theorems (Only Statements & their Verifications).

UNIT-V: Fourier Series

Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Course Outcomes:

1. Apply Beta and Gamma functions to evaluate many integrals which cannot be expressed in terms of elementary functions.
2. Apply Laplace transform to solve differential equations which will be converted to algebraic
3. Evaluate double integrals by changing variables , changing order and triple integration Calculate line integrals along piecewise smooth paths, interpret such quantities as work done by a force
4. Apply Green's theorem to evaluate line integrals along simple closed contours on the plane, Stoke's theorem to give physical interpretation of the curl of a vector field and Divergence theorem to give physical interpretation of the divergence of a vector field
5. Develop Fourier series of periodic functions.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Engineering Mathematics Vol - I, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
4. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.

REFERENCE BOOKS:

1. Shahanaz Bathul (2007), Mathematical Methods, 3rd Edition, Hyderabad, Right Publishers.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Dass H.K. and Rajnish Verma Er (2007), Higher Engineering Mathematics, First Edition, New Delhi, S. Chand & Company Limited.
4. Integral Transforms by A.R.Vasista
5. Schaum's outline series on Vector Analysis; Linear Algebra.
6. Larry C. Andrews and Bhimsen K. Shivamoggi, Integral Transforms for Engineers, Prentice – Hall of India Private Limited, New Delhi.
7. Mathematical Methods of Science and Engineering (Aided with Matlab) Kanti B.Datta (2012), Seventh Edition, CENGAGE Learning.

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English - II

1. 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.

2. OBJECTIVES:

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
3. To develop the study skills and communication skills in formal and informal situations.

LEARNING OUTCOMES:

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

SYLLABUS:

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.
 - i. Listening for general content
 - ii. Listening to fill up information
 - iii. Intensive listening
 - iv. 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:

For Detailed study:

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

For Non-detailed study:

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

UNIT-I

Chapter 1: '**Leela's Friend**' by R.K. Narayan from "Epitome of Wisdom", Published by Maruthi Publications, Hyderabad

2 hrs

G – Present Tense	2
V – Synonyms and Antonyms	2

UNIT-II

Chapter 2: '**Human Values and Professional Ethics**' from "Skills Annexe -Functional English for Success" Published by Orient Black Swan, Hyderabad

2 hrs

L -Listening for specific details and information	1
S- Narrating, expressing opinions and telephone interactions	1
R -Reading for specific details and information	1
W- Writing formal letters and CVs	1

UNIT-III

Chapter 3: '**The Convocation Speech**' by N.R. Narayanmurthy' from "Epitome of Wisdom", Published by Maruthi Publications, Hyderabad

2

hrs

G- Past and future tenses	2
V- Vocabulary - idioms and Phrasal verbs	2

UNIT-IV

Chapter 4: '**Sports and Health**' from "Skills Annexe -Functional English for Success" Published by Orient Black Swan, Hyderabad

2 hrs

L- Critical Listening and Listening for speaker's tone/ attitude	1
S- Group discussion and Making presentations	1
R- Critical reading, reading for reference	1
W-Project proposals; Technical reports, Project Reports and Research Papers	1

UNIT-V

Chapter5: '**The Secret of Work**' from "Epitome of Wisdom", Published by Maruthi Publications Hyderabad.

2

hrs

G- Adjectives, Prepositions and Concord	2
V- Collocations and Technical Vocabulary	2

REFERENCES:

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi.2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson,

Foundation Books.

3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw–Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan, Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

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ENGINEERING PHYSICS – II

Course Objectives:

1. To impart the knowledge of mathematics and science to determine the working of semiconductor devices.
2. Emphasize the study of Quantum mechanics to apply it to solve problems of micro & macro particles.
3. To have the knowledge of laser technology to know about the working & applications of laser.
4. To inculcate the importance of nanotechnology, which has the world wide importance.

UNIT- I PRINCIPLES OF QUANTUM MECHANICS: 08

Waves and particles – De Broglie hypothesis - Matter waves - Davisson and Germer experiment – Schrodinger Wave Equation – Wave function and its Physical Significance - Particle in one dimensional potential box(wave functions, probability densities and energy states).

UNIT- II FREE ELECTRON THEORY OF METALS: 06

Classical Theory, Electrical Conductivity and Ohm's Law – Drawbacks, Sommerfield theory (Qualitative), Density of States, Effect of temperature on the Fermi-Dirac distribution.

BAND THEORY OF SOLIDS: 06

Electron in a periodic potential – Bloch Theorem - Kronig-Penney model (Qualitative) – Origin of energy band formation in solids – Classification of materials into conductors, semiconductors & Insulators - Concept of effective mass of an electron.

UNIT- III SEMICONDUCTOR PHYSICS: 08

Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration – Extrinsic semiconductor and carrier concentration – Characteristics of p-n junction diode - Hall effect, LED, Photodiode.

FIBRE OPTICS 04

Basic principle of optical fibre, Acceptance angle, Acceptance cone, numerical aperture (Quantitative), Types of optical fibre, applications of optical fibre.

UNIT IV LASERS: 06

Characteristics of Lasers – Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and relation between them — Ruby Laser – Helium-Neon Laser –Semiconductor Laser – Applications of lasers.

UNIT V BASIC PRINCIPLES OF NANO SCIENCE: 07

Introduction, surface to volume ratio, quantum confinement – Fabrication of nano materials- Top down fabrication, Bottom up fabrication: sol-gel Technique, CVD method– Characterization (XRD & TEM) - Applications of nanomaterials.

Course Outcomes:

1. Having the knowledge of semiconductors & fiber optics, there will be a chance to know their applications.
2. There will be a chance for them to use the subject as a mathematical tool to solve their real life problems.
3. The students will be able to know the working of different lasers & their real life applications.

TEXT BOOKS:

1. Engineering Physics by P K palanisamy :Sciotech publication
2. Solid State Physics by M Armugam; Anuradha Publications

REFERENCE BOOKS:

1. Introduction to Solid State Physics by Charles Kittel : John Wiley & Sons
2. Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
3. Engineering Physics by V Rajendran; McGraw hill education private ltd.
4. A Text book of Engineering Physics by M N Avadhanulu, P G Kshirsagar; S Chand
5. Engineering Physics by K Malik, A K Singh; Tata Mc Graw hill book publishers
6. Engineering Physics by M.R.Srinivasan, New Age Publishers

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APPLIED CHEMISTRY – II

Course objectives:

1. To appraise the students about the importance and role of chemistry in the field of Engineering by explaining the relevant topics.
2. To enable students to apply the knowledge acquired in improving the properties of engineering materials.
3. To provide the students with the necessary knowledge to solve the problems and make decisions with regards to the application of materials in a variety of engineering disciplines.
4. To equip the students with the required fundamentals of engineering chemistry to carry out in the interdisciplinary research such that the findings benefit the common man.
5. After the completion of the course, the student would understand about the important chemistry of polymers ,corrosion and its control , material chemistry , phase rule and energy sources.

UNIT-I: POLYMER CHEMISTRY:

Introduction, classification of polymer, Types of polymerization (addition and condensation, *mechanisms not included*). Plastics, types of plastics -Thermoplastics and thermosetting plastics. Compounding and moulding of plastics. Preparation, properties and engineering applications of PVC, Teflon and Bakelite. Fibers: Nylon 6, 6 and terelene (Dacron). Elastomers , natural rubber, structure, vulcanization. Synthetic rubbers : Buna-S , butyl rubber , Thikol rubber. Conducting polymers: Classification, mechanism of conduction, Poly acetylene - preparation and effects of doping on conduction. Applications of conducting polymers.

UNIT II: MATERIALS CHEMISTRY: Cement: composition of Portland cement, manufacture of Port land cement, setting & hardening of cement (reactions). Admixtures for cement.

Refractories: Classification, Properties of refractory materials.(refractoriness, RUL test, spalling, dimensional stability and porosity). Characteristics of a good refractory.

Lubricants: Classification of lubricants, mechanisms of lubrication, properties of lubricants: Viscosity and viscosity index, cloud point, pour point, flash & fire point, Insulators : Classification of insulators, characteristics of thermal & electrical insulators and applications.

UNIT III: PHASE RULE and ALLOYS : Definitions - phase, component, degree of freedom, and phase rule equation. Phase diagrams - one component system: water

system. Two component system: lead- silver system. Alloys: classification preparation and objectives in alloy making.

Unit IV: FUELS: Classification, advantages and disadvantages of solid, liquid and gaseous fuels. Solid fuels - coal – classification , analysis - proximate and ultimate analyses and their significance Liquid fuels - petroleum -refining of petroleum , cracking : moving bed catalytic cracking. Knocking- octane number and cetane number. synthetic petrol - Fischer Tropsch's process; Gaseous fuels – LPG and CNG , Combustion , quantity of air required for combustion of the fuel, calorific value of fuel - HCV, LCV, determination of calorific value of a gaseous fuel by Junkers calorie meter. Numerical problems. Flue gas and its analysis by Orsat apparatus.

UNIT V: ADVANCED ENGINEERING MATERIALS: Biodegradable polymers, types , examples: Polyhydroxy butyrate (PHB) ,Poly-Hydroxybutyrate-co-b-Hydroxy valerate (PHBV) ,Polyglycolic acid (PGA) , Polylactic acid (PLA) ,Poly (l-caprolactone) (PCL). Applications of biodegradable polymers. Composite materials: Constituents of composite materials. Types of composite materials. Advantages and engineering applications of composite materials. Biofuels – Biodiesel, general methods of preparation and advantages.

Course Outcomes:

1. Conscientious Students Expatriate And realize the immense importance of polymers and their applicability.
2. All the students under ambit no doubt derive the ins and outs of the construction items their properties and present drive.
3. The abstract phenomenon and the allied industrial applications got in bibed as well transfer to the industry.
4. Engineering minded students well realized the present demand of energy resources in all forms and try to be frugal.
5. Scintillating category students ardent enough in familiarizing the engineering materials on obvious reasons and pass it on.

TEXT BOOKS:

1. Engineering chemistry –II, by NYS.Murthy, Pearson, India.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS:

1. Text Book of Engineering Chemistry by Shasi Chawla, Dhantpat Rai publishing Company, New Delhi (2008).
2. Engineering Chemistry by B. Siva Shankar, Mc.Graw Hill Publishing Company Limited New Delhi -2006.

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ENGINEERING MECHANICS – II

Course Objectives:

1. To develop the analysis of frames with application
2. To teach the basic principles of mechanics applicable to the motion of particles and rigid bodies.
3. To introduce with mathematical description of the plane motion of rigid bodies.
4. To develop the work-energy equation for translations.
5. To develop the equilibrium conditions in terms of virtual work.

UNIT-I

Analysis of perfect frames (Analytical Method) – Types of Frames – Assumptions for forces in members of a perfect frame, Method of joints, Method of sections, Force table, Cantilever Trusses, Structures with one end hinged and the other freely supported on rollers carrying horizontal or inclined loads.

UNIT-II

Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.

UNIT-III

Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies

UNIT-IV

Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion,

Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

UNIT-V

Principle of virtual work: Equilibrium of Ideal systems, efficiency of simple machines, stable and unstable equilibriums

Course Outcomes:

1. Determine the axial forces in the members of trusses.
2. Determine the kinematic relations of particles & rigid body motion.
3. Apply equations of kinetics motions to particle and rigid body motion.
4. Analyze motion of particles & rigid bodies using the principle of work-energy.
5. Determine the equilibrium conditions(FBD) in terms of virtual work

TEXT BOOKS:

1. Engineering Mechanics by Ferdinand. L. Singer
2. Engineering Mechanics by S.S.Bhavikatti J.G.Rajasekharappa.

REFERENCE BOOKS:

1. Engineering Mechanics by Timoshenko & Young.
2. Engineering Mechanics by Meriam and Kraize
3. Engineering Mechanics by K.L.Kumar / Tata McGraw Hill.
4. Engineering Mechanics by A. K. Tayal.

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COMPUTER PROGRAMMING - II

Course Objectives:

1. To explain various sorting and searching techniques
2. To explain structures, unions, and enumeration types and operations on them
3. To understand dynamic memory management using pointers.
4. To introduce basic data structures such as stacks, queues and linked lists.
5. To explain various types of files in 'C' Language.

UNIT - I

Searching and Sorting – Sorting- selection sort, bubble sort, Insertion sort, Quick Sort, Merge sort, Searching-linear and binary search methods.

UNIT - II

Structures - Declaration, initialization, accessing structures, operations on structures, nested structures, arrays of structures, Unions, Enumerated types, Type Definition (typedef), C programming examples.

UNIT - III

Pointers – Concepts, declarations, usage, pointers to pointers, pointer expressions, Arrays and Pointers, array of pointers, parameter passing of pointers, pointers to void, pointers to functions, structures through pointers, self referential structures, C programming examples

UNIT - IV

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.

UNIT - V

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, command –line arguments, C program examples.

Course Out Comes:

1. Upon completion of this course the students will have an:
2. Ability to design various sorting and searching techniques
3. Ability to design user defined data types to solve real world problems
4. Ability to manage heap memory
5. Ability to implement and use data structures like stacks, queues and linked lists
6. Ability to create and use various types of files in 'C' Language.

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.

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ENGINEERING GRAPHICS - II

Course Objectives:

1. To visualize and communicate geometrical elements like Sections of Solids, Development of Surfaces and intersections of similar Solids and its applications in design and manufacturing of various engineering components.
2. To understand the fundamentals of geometry like Isometric Projections and its applications in design and manufacturing of various engineering components.
3. To understand the fundamentals of geometry like Conversion of Orthographic Views to Isometric Views and its applications in design and manufacturing of various engineering components.
4. To understand the fundamentals of geometry like Perspective Projections and its applications in design and manufacturing of various engineering components.
5. To understand the fundamentals of geometry like Computer Aided drafting and its applications in design and manufacturing of various engineering components.

UNIT – I

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

Development of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their parts.

Intersection of Similar Solids: Line method - Intersection of Prism Vs Prism, Cylinders Vs Cylinder Simple treatment only. **(Dissimilar category- this part can be removed.)**

UNIT – II

Isometric Projections/views: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

UNIT –III

Transformation of Projections: Conversion of Orthographic Views to Isometric Views and Isometric views to orthographic views.

UNIT –IV

Perspective Projection: Principle, Perspective elements, Perspective View of Points, Lines, Plane Figures and Simple Solids; Vanishing Point Method, Visual Ray Method.

UNIT –V

Introduction to Computer Aided Drafting: Generation of points, lines, curves, polygons, simple solids, dimensioning. (Simple treatment only) – 2 experiments instead of sheets.

Course Outcomes:

1. To Draw and understand about the Sections of Solids, Development of Surfaces and

intersections of similar Solids used in Engineering Graphics.

2. To Draw and understand the construction Principles involved in Isometric Projections.

3. To Draw and understand about Conversion of Orthographic Views to Isometric Views

and also represent it's Transformation of Projections.

4. To Draw and understand about the construction Principles involved in Perspective

Projections.

5. To Draw and understand about the Computer Aided Drafting used in Engineering Graphics

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers

2. Engineering Drawing, K.L.Narayana and Kannaiah / Sciotech publishers.

REFERENCES:

1. Engineering graphics with Auto CAD- R.B Choudary / Anuradha Publishes

2. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.

3. Engineering Drawing, Basant Agarwal, TMH

4. Engineering Drawing, R. K. Dhawan, S.Chand Publishers.

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English Language Communication Skills Lab-II

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:

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

Learning Outcomes:

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

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

- 1. Computer Assisted Language Learning (CALL) Lab**
- 2. Interactive Communication Skills (ICS) Lab**

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

Exercise-I

CALL Lab: Minimal Pairs

Word accent and Stress Shifts

Listening Comprehension

Exercise-II

ICS Lab: Descriptions- Narrations- Giving Directions and Guidelines

Question Tags and One-Word Substitutes

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

Exercise-III

CALL Lab: Intonation and Common Errors in Pronunciation.-Neutralization of Mother Tongue Influence and Conversation Practice.

Exercise-IV

ICS Lab: Extempore- Public Speaking

Active and Passive Voice,

Common Errors in English,

Idioms and Phrases

Exercise-V

ICS Lab: Information Transfer

Oral Presentation Skills

Reading Comprehension

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. **Strengthen Your Steps** - Dr. M. Hari Prasad and others, Maruthi Publications
3. Speaking English Effectively 2nd Edition by Krishna Mohan and N. P. Singh, 2011.
Macmillan Publishers India Ltd. Delhi.
4. Sasi Kumar, V & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
5. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
6. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013 Orient Blackswan. Hyderabad.
7. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
8. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
9. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi : Foundation
10. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
11. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
12. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
13. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
14. **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.

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ENGINEERING PHYSICS AND APPLIED CHEMISTRY LAB - II

ENGINEERING PHYSICS:

Any Five Experiments from the following:

1. Energy gap of a semiconductor material
2. Decay of charge - R C circuit and time constant
3. L C R Series circuits
4. Diffraction Grating with sodium vapor lamp
5. Single Slit with laser source
6. Numerical Aperture of an Optical Fibre
7. Bending losses of an Optical Fibre
8. Seebeck Effect

APPLIED CHEMISTRY LAB – II:

Course objectives:

1. To impart fundamental knowledge in handling the equipment /glassware and chemicals in the chemistry laboratory.
2. To offer hands on experience on the basic equipment related to engineering chemistry.
3. For practical understanding of theoretical concepts of chemistry.

Number of periods = 3 in two weeks.

(Any seven experiments out of the following ten experiments should be performed)

1. Estimation of HCl by conductometry using standard NaOH solution.
2. Estimation of HCl by potentiometry using standard NaOH solution.
3. Determination of strength of an acid by pH metry
4. Determination of cloud point and pour point of a lubricant
5. Synthesis of phenol – formaldehyde and urea formaldehyde resins .
6. Preparation of Biodiesel from Waste Vegetable Oil (WVO).
7. Determination of viscosity of sample oil .

8. Estimation of Copper by Colorimetric method.
9. Preparation of thikol rubber and nylon 6:6
10. Determination of carbon residue /flash point –fire point of a lubricant

Course Outcomes:

1. Awareness in obtaining some important products with enough yield.
2. gets familiar with synthesis of thermosetting plastics.

TEXT BOOKS:

1. Fundamentals of physics-D. Halliday , R.Resnick & john wiley.
2. Optics- A. Ghatak,Tata Magrawhill.
3. Practical physics- GL Squires.
4. 1. Vogel's Textbook of Quantitative Chemical Analysis
5. Essentials of experimental engineering chemistry , Shashi Chawla, Dhanpat Rai & Co
6. Laboratory manual of engineering chemistry, S.K.Bhasin and Sudha Rani , Dhanpat Rai & Co.

REFERENCE BOOKS:

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

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ENGINEERING WORKSHOP – II AND IT WORKSHOP

Course Objectives:

1. To impart the knowledge regarding the various techniques, skills and tools necessary for engineering workshop practice.
2. To provide the students with hands on experience on different trades of engineering workshop like black smithy, foundry and welding.
3. To learn about the machines in view of constructions details, different operations to be performed on the machines and different tools.
4. To enhance the practical approach towards machine tools.
5. To introduce the concepts of power tools in constructions, wood working, electrical engineering and mechanical engineering in manufacturing applications.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Black smithy
2. Foundry
3. Welding

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine shop
3. Power tools in construction, wood working, electrical engineering and mechanical engineering.

Course Outcomes:

1. To prepare a various shape of (S-shape, T- shape, Z- shape)
2. To prepare a single piece and double piece pattern by using casting process
3. To make a lap-joint, but-joint and angular joint.
4. To prepare a pipe joint , tap- connections by using plumbing.
5. To apply different operations to be performed on the lathe machines.
6. To prepare a switch boards , wood drilling and threading different various sizes.

IT WORKSHOP:-

Objectives:

The IT Workshop for engineers is a training lab course spread over 40 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, and Power Point.

1. **IT Workshop-I:** Computer hardware, identification of parts, disassembly, assembly of computer to working condition, sample diagnostic exercises.
2. **IT Workshop-II:** Installation of operating system windows and Linux simple diagnostic exercises.

TEXT BOOKS:

1. Work shop manual - P.Kannaiah/K.L Narayana/scitech publishers.
2. Workshop manual by Venkat Reddy

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I Year B.Tech. CE – II Sem

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COMPUTER PROGRAMMING II LAB

Course Objectives:

1. To make the student to implement various sorting and searching techniques
2. To introduce the student to structures, unions, and enumeration types and operations on them
3. To introduce the student dynamic memory management using pointers.
4. To introduce basic data structures such as stacks, queues and linked lists.
5. To make the student to create various types of files in 'C' Language.

Week 1:

Review of Arrays and functions.

Week 2:

Write programs to illustrate the implementation of Bubble Sort and Selection Sort

Week 3:

Write programs to illustrate the implementation of Insertion Sort and Quick Sort

Week 4:

Write programs to illustrate the implementation of Merge Sort.

Week 5:

Write programs to illustrate the implementation of Binary Search and Linear Search.

Week 6 & 7:

Write programs to illustrate the various concepts of structures

Week 8:

Write programs to illustrate the concepts of accessing variables using pointers

Week 9:

Write programs to illustrate the implementation of call by reference

Week 10:

Write programs to illustrate the implementation of arrays using pointers

Week 11:

Write programs to implement structures using pointers

Week 12:

Write program to illustrate the implementation of Single Linked List

Week 13:

Write programs to illustrate Stack operations using arrays and pointers

Week 14:

Write programs to illustrate Queue operations using arrays and pointers

Week 15:

Write programs to illustrate the various concepts of files.

Week 16: Review.



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Civil Engineering

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II YEAR I SEMESTER

COURSE STRUCTURE

Code	Subject Name	L	T/P/D	C
A53001	Mathematics-III	4	1	4
A53002	Electrical & Electronics Engineering	4	1	4
A53003	Environmental Studies	3	1	3
A53004	Surveying - I	3	1	3
A53005	Strength of Materials - I	3	1	3
A53006	Fluid Mechanics	4	1	4
A53201	Surveying Lab - I	0	3	2
A53202	Strength of Materials Lab-I	0	3	2
	Total	21	12	25

II YEAR II SEMESTER

COURSE STRUCTURE

Code	Subject Name	L	T/P/D	C
A54001	Probability And Statistics	3	1	3
A54002	Surveying II	4	1	4
A54003	Strength of Materials - II	4	1	4
A54004	Hydraulics And Hydraulic Machinery	4	1	4
A54005	Building Materials, Construction & Planning	4	0	4
A54201	Surveying Lab -II	0	3	2
A54202	Computer Aided Drafting of Buildings	0	3	2
A54203	Fluid Mechanics And Hydraulic Machinery Lab	0	3	2
	Gender Sensitization	0	0	2
	Total	19	14	27

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

T – Tutorial

P – Practical

D – Drawing

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(A53001) MATHEMATICS-III

UNIT-I: Partial differential equations

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations, Charpits Method.

UNIT-II: Partial Differential Equations and its Solutions

Classification of second order linear Partial Differential Equations, separation of variables methods for the solutions of one dimensional heat equation, wave equation and two-dimensional Laplace equation under initial and boundary conditions.

UNIT-III:

Solution of Non- linear Systems

Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

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

UNIT-IV:

Curve fitting, Numerical Differentiation & Numerical Integration

Curve fitting: Fitting a straight line – Second degree curve – exponential curve-power curve by method of least squares. Differentiation, Simpson's 3/8 Rule, Gaussian Integration, Evaluation of principal value integrals, Generalized Quadrature.

UNIT – V: Numerical solution of IVP's in ODE

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's

Method of successive Approximations-Euler's Method-Runge-Kutta Methods – Predictor-Corrector Methods- Adams-Bash forth Method.

TEXT BOOKS:

1. Grewal B.S (2007), Higher Engineering Mathematics, 40th Edition, New Delhi, Khanna Publishers.
2. Iyengar T.K.V., Krishna Gandhi B. & Others (2011), Mathematical Methods, 10th Revised Edition, New Delhi, S. Chand & Company Limited.
3. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley.
4. Mathematical Methods by B.V Ramana.

REFERENCE BOOKS:

1. Shahanaz Bathul (2007), Mathematical Methods, 3rd Edition, Hyderabad, Right Publishers.
2. Jain R. K., and Iyengar S. R. K (2008), Advanced Engineering Mathematics, 3rd Edition, New Delhi, Narosa Publication House.
3. Introductory Methods of Numerical Analysis. S.S. Sastry, Prentice Hall.
4. Numerical Analysis (Paper IV), First Edition 2010, Telugu Akademi, Hyderabad.
5. Schaum's outline series on Matrices.
6. Mathematical Methods by Shankaraiah

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(A53002) ELECTRICAL & ELECTRONICS ENGINEERING

Objectives:

- To acquire knowledge in electrical circuits
- To be able to understand the basic principle operations of electrical machines. To know about various circuits for AC, DC Solar and UPS
- To know how to protect the buildings from electrical shocks.
- 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 Oscilloscope: 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:

- Apply knowledge on basic electrical circuits, parameters.
- Analyze the operation of the transformers in the energy conversion process.
- To understand electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features.
- Evaluation of measuring instruments like voltmeter, ammeter, wattmeter etc...
- Working principle of CRO and its internal parts.

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(A53003) ENVIRONMENTAL STUDIES

Objectives:

- To study the sources of water, occurrence of floods and its impact on environment. To know about the ecosystem and energy resource system
- To understand the Biodiversity concept and its advantages
- To study the different types of pollutions and its impact on environment
- To know the social and environment related issues and their preventive measures

UNIT – I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

1. **Ecosystems:** Concept of an ecosystem – Classification, structure and function of different ecosystems - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids.
2. **Biodiversity and its conservation:** Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. ICUN categories of biodiversity and RED DATA book - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – II

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems: Forest resources – Use and over – exploitation, deforestation, – Timber extraction, mining, dams and other effects on forest and tribal people: Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. - Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources: Equitable use of resources for sustainable lifestyles.

UNIT – III

1. **Environmental Pollution:** Definition, Cause, effects and control measures of:
Air pollution b. Water pollution

1. Soil pollution
2. Marine pollution
3. Noise pollution
4. Thermal pollution
- Nuclear pollution.
- e -Waste

2. **Social Issues and the Environment:** From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, and watershed management. -Climate change, global warming, ozone layer depletion, nuclear accidents and holocaust.

UNIT – VI

1 Waste management technology: Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution, Disaster management: floods, earthquake, cyclone and landslides.

Waste water and sewage treatment technology: primary, secondary and tertiary treatments. Bioremediation, Photo-remediation, ZLD (zero liquid discharge), membrane technology. Application of GIS and GPS system in environmental science.

2 Environmental policy, Rules and regulations. EIA (Environmental Impact Assessment) & EMP (ENVIRONMENTAL Management Plan) – Environment Protection Act. - Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act –Forest Conservation Act.-Public awareness. Global environmental problems and global efforts.

UNIT – V

1. **Towards sustainable future:** concept of sustainable development, threats of sustainability, population and its explosion, over exploitation of resources, strategies for achieving sustainable development. Environmental education, Conservation of resources. Urban sprawl, sustainable cities and sustainable communities, human health. Role of IT in environment, environmental ethics, concept of green building, Basic principles of Green engineering, clean development mechanism (CDM), Low carbon life cycle, Polluters-pay principle.

2. **Field work:** Visit to a local area to document environmental assets
River/forest grassland/hill/ mountain Visit to a local polluted site-
Urban/Rural/industrial/ Agricultural Study of common plants, insects,
birds, Visit to effluent treatment Plant/sewage treatment plant Study of
simple eco systems pond, river, hill slopes, etc.

Mini projects by students which is mandatory.

TEXT BOOK:

2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
3. Mishra and Pandey.
4. P.D.Sharma
Environmental Studies by R. Rajagopalan, Oxford University Press.

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(A53004) SURVEYING - I

Objectives :

- To Understand need for surveying, evolution of surveying
- To understand the degree of accuracy of surveying
- To know various methods of distance measurement
- To methods of horizontal and vertical angle measurement
- To understand the concepts of Geographical representation of a point or object
- To understand use of aerial photographs, satellite imagery
- To understand the limitations of traditional surveying and modern surveying
- To understand the various surveying methods in other civil engineering subjects To study different methods of calculation of area, volumes using contours.

Instructional Objectives:

- Revision of trigonometric formulae; sin rule, cosine rule,
- Minimum number of measurements required to plot various shapes triangle, rectangle, quadrilateral and polygon
- Vernier scale
- Area measurement are, acre, square meter, hectare etc., and their conversions

UNIT I

Introduction: Overview of plane surveying - Objectives, Principles and Classifications of surveying.

Chain Surveying - Principles - Chain Survey instruments – Distance measurement conventions and methods - Direct and indirect Ranging – Obstacles in ranging Distances and Direction.

UNIT II

Compass Survey: Use and adjustment of Prismatic and Surveyors' Compass. Methods of Surveying with compass, whole circle bearing system, quadrant bearing system. Fore bearing and back bearing. True meridian, magnetic meridian, dip, magnetic declination - calculation of included angles from bearings. Calculation of bearings from included angles. Detection of local attraction and its elimination. Errors in prismatic survey., plotting of compass survey, correction of errors in prismatic survey. Distribution f closing error graphically Bowditch's method.

UNIT III

Plane table survey: Instruments employed in plane table survey. Use and adjustment of these instruments including simple alidade. Setting up of the table. Various methods of plane table survey. Radiation method, intersection/triangulation method of plane tabling. Traversing, resection method of plane tabling. Three point and two point problems. Errors in plane tabling. Advantages and disadvantages of plane tabling

UNIT IV

LEVELLING: Definitions and principles of construction of a levelling instrument and parts. Use of dumpy level, tilting level and auto levels. Types of leveling staves. Methods of booking and reduction of levels. Bench marks, establishment of bench marks by longitudinal leveling and cross sectional levelling. Fly leveling, reciprocal leveling. Errors in leveling, curvature and refraction correction.

UNIT V

Calculation of areas and Volumes: Simpsons rule and trapezoidal rule, computation of area of cross section of level section and two level section.

Contouring. Definition of contour, contour interval and characteristics of contours. Direct and indirect methods of contouring uses of contours, grade contours.

Computation of volumes of earth work and water storage by means of contour lines and sections. Computation of volume from spot levels..

TEXT BOOKS:

1. BC Punmia, Surveying Vol 1 & 2
2. Arora KR surveying Vol 1 & 2
3. TP Kanetkar and SV Kulkarni Surveying and levelling.
4. Surveying for Civil Engineers S.Mhaboob Basha, Anuradha Publications

REFERENCE:

1. Fundamentals of Surveying SK Roy
2. Surveying Theory and Practice, SS Bhavikatti
3. Surveying Vol 1, 2 by SK Duggal

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(A53005) STRENGTH OF MATERIALS - I

Objectives:

- To understand the basic concept of Elasticity, stress and strain for different materials
- To know the mechanism of development of shear force and bending moments in beams
- To analyse and understand bending stress and shear stress
- To study compound stresses, direct and bending stresses in different members
- To know the concept of unsymmetrical bending and shear centre for different members

Instructional objectives:

- The teacher shall show various materials like elastic, glass, wooden members its properties.

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.

STRAIN ENERGY: Resilience-Gradual, sudden, impact loadings-simple axial load applications.

UNIT II:

SHEAR FORCE AND BENDING MOMENT: Definition of beam-Types of beams-concept of shear force and bending moment-S.F and B.M diagrams for cantilever, simply supported with and without overhanging beams subjected to point loads, uniformly distributed load, uniformly varying load Couples and combination of these loads -Relation between S.F, B.M and rate of loading.

UNIT III:

FLEXURAL STRESSES & SHEAR STRESSES IN BEAMS :

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, L and C sections.

SHEAR STRESSES: Introduction and Concepts - Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T, L sections.

UNIT IV:

DEFLECTION OF BEAMS: Pure bending in a beam - its derivation & Relation Between deflection and slope, radius of curvature for a pure bending- elastic curve for beams-

Determination of slope and deflection for cantilever and simply supported beams, subjected to point loads, U.D.L, Uniformly varying loads and with over hanging beams by using Double integration method & Macaulay's method, Moment area method, conjugate beam method applied to simple beams.

UNIT V:

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-Various theories of failures like Maximum Principal stress theory, Maximum principal strain theory -Maximum shear stress theory-Maximum strain energy theory-Maximum shear strain energy theory.

TEXT BOOKS:

- 1) Mechanics of Materials-Dr. Puppa, Ramamrutham Laxmi publications.
- 2) Strength of Materials-B.S.basavarajaiah, University Press, Hyderabad. Strength of Materials practical approach, DS Prakasha Rao, University Press.

REFERENCE BOOKS:

- 1) Mechanics of Solid, by Ferdinandp Beer and others-Tata Mc.Grawhill publications 2000.
- 2) Strength of materials by Schaum's out line series-Mc.Grawhill International Editions.
- 3) Strength of materials by R.K.Rajput, S.Chand & Co, New Delhi.
- 4) Strength of materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
- 5) Strength of materials by Bhavi Katti. New Age Publications.
- 6) Strength of materials by Third Edition, EJ Hearn.

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(A53006) FLUID MECHANICS

Objectives:

- To know various fluid properties, concept and method of fluid pressure measurement To understand the basic concepts of fluid motion
- To study different equations of fluid motion and fluid dynamics
- To analyse different flow characteristics of laminar and turbulent flows To study the motion of gases for different conditions of expansion.

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, Pascals law, Hydrostatic law - atmospheric, gauge and vacuum pressure measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces _Center of pressure. Derivations and problems.

UNIT II:

FLUID KINEMATICS : Description of fluid flow, Stream line, path line 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, flow net analysis.

UNIT III:

FLUID DYNAMICS : Surface and body forces- Eulers and Bernoullie'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.

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 derivations) BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect LAMINAR & TURBULENT FLOWS

Reynolds experiment - Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

UNIT V:

CLOSED CONDUIT FLOW: 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 Reynolds number –Moody's Chart.

MEASUREMENT OF FLOW : Pitot tube, Venturimeter and orifice meter - classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches -Broad crested weirs.

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. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer , Oxford University Press, New Delhi.

REFERENCE BOOKS:

1. Fluid Mechanics by J.F.Douglas, J.M. Gaserek and J.A.Swaffield (Longman),V.J.Streeter.
2. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
3. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal – Laxmi Publications (P) Ltd., New Delhi

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(A53201) SURVEYING LAB-I

OBJECTIVES:

1. To understand the basic practical applications of survey instruments
2. To know the field measurements and field observations
3. To study and understand the different methods involved in survey field work.

LIST OF EXPERIMENTS:

1. Introduction to different survey instruments.
2. Survey of an area by chain survey. (Closed traverse and plotting).
3. Chaining across obstacles (different cases).
4. Survey of an area by compass and tape. (Closed, traverse, plotting).
5. Determination of distance between two inaccessible points with compass.
6. Plane table survey. (Radiation & traversing and intersection methods).
7. Two point and three point problem in P. T. S.
8. Simple, fly, differential leveling.
9. Exercise of L.S and C.S and plotting.
10. Two exercises on contouring.

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(A53202) STRENGTH OF MATERIALS LAB

OBJECTIVES:

- To know and understand the experiments on various materials to assess their behaviour and limitations
- To know the brittle and ductile material failure patterns by conducting experiments
- To understand shear force, bending moment and deflections for different types of beams
- To know the rigidity modulus by conducting spring and torsion test.

1. Torsion Test
2. Bending test on steel/wood cantilever beam
3. Bending test on simply supported beam
4. Hardness test
5. Tension test
6. Test on Helical Spring
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's reciprocal theorem.
11. Demonstration on use of electrical resistance gauges
12. Deflection test on cantilever beams

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(A54001) PROBABILITY AND STATISTICS

UNIT-I

Probability: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem. Random variables – Discrete and continuous – Distribution – Distribution function.

UNIT-II

Distribution, Binomial and poison distributions Normal distribution – related properties. Sampling distribution: Populations and samples - Sampling distributions of mean (σ known and unknown)

UNIT-III

Estimation: Point estimation – interval estimation, Test of Hypothesis– Type I and Type II errors. One tail, two-tail tests, Large sample test: concerning means - proportions. Small

sample test: Student's t-test, F-test and χ^2 test

UNIT-IV

ANOVA for one – way, two – way classification. Design of Experiment: CRD, RBD, LSD.

UNIT-V

Stochastic Process: Stochastic Matrix, Random Walk models: Gambler Ruin, Probability of ruin, Markov Chain : Classification of States, Classification of chains.

TEXT BOOKS:

1. Probability and Statistics by T.K.V. Iyengar & B. Krishna Gandhi & Others, S. Chand.
2. A first course in Probability and Statistics by B. L. S. Prakasa Rao, World Scince.
3. Probability and Statistics for Engineers, Miller and John E. Freund Prentice Hall of India.

REFERENCE:

1. A.V. Skorokhod, Basic Principles and Applications of Probability Theory, Springer.
2. Zivorad R. Lazic, Design of Experiments in Chemical Engineering, Wiley-VCH.
3. Hwei P. Hsu, Theory and Problems of Probability, Random Variables, and Random Processes, Schaum's Outline Series, McGraw- Hill.
4. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, JohnWiley & Sons, Ltd.
5. Arnold O. Allen, Probability & Statistics, Academic Press.
6. Miller and John E. Freund, Probability & Statistics for Engineers, Prentice Hall of India.
7. Mendan Hall, Probability & Statistics, Beaver Thomson Publishers.
8. Montgomery: Design and Analysis of Experiments, 6th Edition, Wiley.

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(A54002)SURVEYING - II

UNIT I

Theodolite: Theodolite description, types of theodolites . definitions of various axes. uses and adjustments – temporary and permanent measurement. of horizontal and vertical angles by repletion and reiteration. Errors in Theodolite survey.. Principles of electronic Theodolite. Total Station, types and applications of total station.

UNIT II

Theodolite traversing and computations. Traversing by included angles, bearings. Conditions of closed traverse. Gales traverse table, cosing error and its adjustment by various methods, coordinates, traverse and their computations.

Trigonometrical levelling. Traversing. Tacheometric surveying. Stadia and tangential methods of Tacheometry. Distance and elevation formulae for staff vertical position.

UNIT III

Curves: Horizontal Curves –Types of horizontal curves. Setting out simple curves by linear and instrumental methods. Compound curves., reverse curves, transition curves. Computation of elements of transition curve.

UNIT IV

Vertical Curves. Types of vertical curves, length of vertical curves sight distance on sag curve passing under an overhead structure, elements of a summit and sag curves, analysis of sight distance on summit and sag curves. Computations of setting out data of summit and sag curves, setting out methods of vertical curves..

UNIT V

Aerial Photogrammetry : Principles, definitions, types of photographs. Stereoscopy, scale relief displacement, format and lens angle, flight planning by remote sensing types of sensors. Remote sensing Principle, components and classifications, remote sensing satellite imagery with special relevance to Indian Remote Sensing Satellite and applications.

GPS surveying: Introduction & Components of GPS, space segment, control segment and user segment, elements of satellite based survey.

Geographical Information System (GIS) definition, components, applications and advantages. Introduction to Hydrographical Survey.

TEXT BOOKS.

1. BC Punmia, Surveying Vol 1 & 2
2. Arora KR surveying Vol 1 & 2
3. TP Kanetkar and SV Kulkarni Surveying and levelling.

REFERENCE:

1. Fundamentals of Surveying SK Roy
2. Surveying Theory and Practice, SS Bhavikatti
3. Surveying Vol 1, 2 by SK Duggal
4. Principles of GIS PA Barroagh

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(A54003) STRENGTH OF MATERIALS – II

UNIT I

Torsion of circular shafts

Theory of pure torsion – Assumptions-derivation of Torsion Equations- Assumptions made in the theory of pure torsion – Torsional moment of resistance – Torsion module – power transmitted by shafts – combined bending and torsion.

SPRINGS

Introduction – type of springs – deflection of closed and open coiled helical springs under axial pull and axial couple - springs in series and parallel – carriage or leaf springs

UNIT II

Direct and Bending Stresses

Stresses under the combined action of direct loading and eccentric loading- 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.

Unsymmetrical bending

Introduction – centroidal principal axes of section – 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 axis through the centroid - location of neutral axis - deflection of beams under unsymmetrical bending

UNIT III

Propped Cantilevers :Cantilever beams on elastic and rigid props for point loads and uniformly distributed loads. Calculation of reactions, Shear force , bending moment diagrams and deflections.

Fixed beams: Determination of shear force and bending moment , slope and deflections in fixed beams with and without sinking of supports for point loads, uniformly distributed loads, uniformly varying loads.

Continuous beams: Determination of moments in continuous beams with and without sinking of supports by theorem of three moments. Shear force and bending moment diagrams.

UNIT IV

Beams curved in plan & shear Strengths

Introduction – circular beams loaded uniformly and supported on symmetrically placed columns - semi circular beam simply supported on three equally spaced supports

UNIT V

columns and struts

introduction – types of columns - short medium and long columns . Axially loaded compression members - crushing load – Eulers theorem for long columns assumptions derivation eulers critical load formulae for various end conditions equivalent length of columns- slenderness ratio – Eulers critical stress - Limitations of Eulers theory – Rankine Gordon formula - Long columns subjected to eccentric loading – secant formula – empirical formulae - straight line formula - Prof Perry's formula

Beam columns

Laterally loaded strut subjected to uniformly distributed and concentrated loads - Maximum BM and Stress due to transverse and lateral loading

TEXT BOOKS:

1. A Text of strength of materials by RK Bansal - Laxmi publication (P) It., New Delhi
2. Strength of materials by Basavarajaiah and Mahadevappa, university press
3. Strength of Materials by Vazrani and Ratwani
4. Mechanics of Structures Vol I and Vol II, by SB juwankar, Charity Publishers

REFERENCE:

1. Mechanics of Solid, by ferdinandp, beer and others – Tata Mc Grawhil Publications 2000
2. Strength of Materials by Bhavikatti, Vikas publications
3. Strength of Materials by S. Ramakrishna and R. Narayan - Dhanpat rai publications
4. Strangth of materials by Rk Rajput, S. Chand & Co, New Delhi
5. Strength of Materials by Ar Basu, Dhanpat Rai and Co, Nal sarah, New Delhi.
6. Strength of Matteredials by LS Srinath etal, Macmillan India Ltd, Delhi
7. Strength of Materials by Timoshonko & Young

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(A54004) HYDRAULICS AND HYDRAULIC MACHINES

UNIT I

Open channel Flow Types of flows type of channels – velocity distribution – energy and momentum correction factors - Chezy's mannings and bazin formulae for uniform flow – Most economics sections

Critical flow specific energy - critical depth - computation of critical depth - critical sub-critical and super critical flows

Open channel flow II : non uniform flow dynamic equation for GV mild, critical, steep, horizontal and adverse slopes

UNIT II

surface profiles direct step method, rapidly varied flow, hydraulic jump, energy dissipation Hydraulic 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

Basics of turbo machinery

Hydrodynamic force of jets on stationery and moving flat, inclined and curved vanes, net 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.

Hydraulic turbines - I

Layout of a typical hydropower installation heads and efficiencies classification of turbines pelton wheel, Francis turbine, Kaplan turbine,

UNIT IV

Working proportions, velocity diagram, work done and efficiency, hydraulic design draft tube, theory and function efficiency.

Hydraulic turbines II: governing of turbines sure tanks - unit and specific turbines unit speed unit quantity unit power - specific speed performance characteristics - geometry similarity cavitations

UNIT V

Centrifugal Pumps

Pump installation details - classification work done - Manometric head - minimum starting speed – losses and efficiencies - specific speed - multi stage pumps - pumps in parallels - performance of a pumps characteristic curves - NPSH - Cavitations

Hydropower engineering - classification of hydro power plants definition of terms - load factor - utilization factor, capacity factor, estimation of hydropower potential

TEXT BOOKS:

Open channel flow by K Subramanya - Tata MC Grawhill Publishers

Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard Book house Fluid Mechanics & fluid machines by narayana Pillai, Universities Press.

REFERENCES:

1. A text of Fluid mechanic and Hydraulic achiness by Dr. RK Bansal Lamxi publication
(P) old New Delhi
2. Elements of Open channel flow by Ranga Raju, Tata MC Graw Hill publications
3. Fluid mechanics and fluid machines by Rajput, S chand &n Co
4. Open channel flow by VT chow, MC Graw hills Book company
5. Fluid mechanics and machinery by D ramadurgaiah, new age publications.

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(A54005) BUILDING MATERIALS, CONSTRUCTION AND PLANNING

Objectives:

- To understand the construction materials properties and production
- To understand the fundamentals in different structures
- To study the different covering materials and their applications
- To know the building services, planning and evaluation of structures
- To study about the various types of cements and admixtures

UNIT I

STONES, BRICKS AND TILES:

Building stones – Classifications – quarrying – properties – structural requirements - Dressing of bricks - Composition of good brick earth - manufacture of bricks and – structural requirements.

WOOD, ALUMINIUM, GLASS AND POINTS: Structure – types and properties – Seasoning – Defects in timber: Alternative materials for wood , Galvanized Iron/ Fiber-reinforced glass bricks, steel & Aluminum.

UNIT II

CEMENT & ADMIXTURES: Ingredients of cement – manufacture – Chemical composition – hydration – field & laboratory tests for Cement .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 – type; Damp proof course; Joinery – doors – windows – materials - types.

BUILDING SERVICES: plumbing services : Water distribution , Sanitary – Lines & fitting ; Ventilations Functional requirements systems of ventilations Air conditioning – Essentials and types ; Acoustic design ; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions.

UNIT IV

MASONRY AND FINISHING: Brick masonry - Types - bonds, stone masonry – types; composite masonry – brick – stone composite; concrete, reinforced brick.

FINISHINGS: 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 Buildings and Buildings by laws

TEXT BOOKS:

1. Building material by S K Duggal – New Age International Publishers; Second Edition

2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain Laxmi

Publications (P) Ltd., New Delhi

3. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New

Delhi

4. Building Materials and construction – Arora 7 Bindra, Dhanpat Roy Publications

REFERENCES:

1. R.Chudly “Construction Technology “– Volumes I and II” 2nd Edition, Longman, UK, 1987.

2. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi

3. basics of Civil Engg by Subhash Chander; Jain brothers.

4. Construction technology – Vol- I & II by R. chuddy, Longgman

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(A54201) SURVEYING LAB - II

List of Experiments:

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 distances problems (Two exercises)
4. Heights and distances using principles of tacheometric surveying (Two Exercises)
5. Curve Setting - Different methods (Two exercises)
6. Setting out works for building and 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 differential height between two inaccessible points using Total Station.
13. Study and interpretation of Aerial photographs and satellite imagery
14. Study of topographic map
15. Map Projections.

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(A54202) 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 storyed buildings
 - (b) multi storyed buildings
5. Developing sections and elevations for
 - (a) Single storyed buildings
 - (b) multi storyed 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 prakash & Dr.G.S.Servesh-Laxmi Publications.
2. Engineering Graphics by P.J.Sha-S.Chand&Co.

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(A54203) FLUID MECHANIS AND HYDRAULIC MACHINARY LAB

List of Experiments

1. Calibration of venturimeter & Orifice meter
2. Determination of Coefficient of Discharge for a small Orifice / Mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of Friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's Equation.
7. Impact of Jet on Vanes.
8. Study of Hydraulic jump.
9. Performance test on Pelton Wheel turbine.
10. Performance test on Francis turbine
11. Performance characteristics of a single stage / multi stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

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II Year B.Tech. CE-I Sem

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(A54204) GENDER SENSITIZATION

(Mandatory Course)

Course Objectives:

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

Learning Outcomes:

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

Unit-I:-

UNDERSTANDING GENDER:

Gender: Why should we Study it? (Towards a world of equals: Unit - 1)

Socialization: Making women, Making Men (Towards a world of equals: Unit – 2)

Introduction. Preparing for Womanhood Growing up male. First lessons in Cases. Different masculinities.

Just Relationships: Being Together as Equals (Towards a world of equals: Unit – 12)

Mary Kom and onles love and Acid just do not Mix. Love Letters, Mothers and Fathers.
Further Reading: Rose Parks The Brave Heart.

Unit – II:

GENDER AND BIOLOGY:

Missing Women: Sex Selection and its consequences (Towards a world of equals: Unit – 4)

Destining Sex Ratio, Demographic Consequences.

Gender Spectrum: Beyond the Binary (Towards a world of Equals unit – 10)

Two or Many? Struggles with Discrimination

Additional reading: Our Bodies, Our Health (Towards a world of equals: Unit – 13)

Unit – III:**GENDER AND LABOUR:**

Housework: the Invisible Labour (Towards a world of equals: Unit – 3)

“My Mother doesn’t Work.” “Share the Load.”

Women’s Work: Its Politics and Economics (Towards a world of equals: Unit – 7)

Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

Unit – IV:**ISSUES OF VOLENCE:**

Sexual Harassment: Say Not (Towards a world of equals: Unit – 6)

Sexual Harassment: not Eve teasing Coping with Everyday Harassment Further Reading: “*Chupalu*”.

Domestic Violence: Speaking Out (Towards a world of equals: Unit – 8)

Is home a safe place? – When women unite [Film]. Rebuilding lives Further Reading New Forums for Justice.

Thinking about Sexual Violence (Towards a world of equals: Unit – 11)

Blaming the Victim-“I fought for my life....” – Further Reading: The Caste Face of Violence

Unit – V:**GENDER STUDIES:**

Knowledge: Through the Lens of Gender (Towards a world of equals: Unit – 5)

Point of view Gender and the structure of knowledge. Further Reading: Unacknowledged women Artists of Telangana.

Whose History? Questions for historians and others (Towards a world of equals: Unit – 9)

Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading: All The Units In the Textbook, “ Towards a World of Equals: A Bilingual Textbook on Gender” written by A.Suneetha, Uma Bhugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is interdisciplinary course, Resource Persons can be drawn from the fields of English Literature or Sociology or political science or any other qualified faculty who has expertise in this field.

REFERENCE BOOKS:

1. Sen, Amartya. “More than One Million Women are Missing.” New York of books 37.20 (20 December 1990). Print. “we Were Making History...” Life Stories of Women in the Telangana People’s Struggle. New Delhi: Kall for Women. 1989.
2. Tripti Lahiri. “By the Numbers: Where Indian Women Work.” Women’s Studies Journal (14 November 2012) Available online at : <http://blogs.wsj.com/india-real-time/2012/11/14/by-the-numbers-where-indian-women-work/>
3. K.Satyanaraya and Susie Tharu (Ed.) Steel Nibs Are Sorouting: New Dalit Writing From South India, Dussier 2. Telugu And Khannada
4. Vimala. “Vartillu (the Kitchen)”. Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Tharu and K.Lalits. Delhi:Oxford University Press, 1995. 599-601.
5. Shatruguna. Veana At . Women’s Work and its Impact on Child Health and Nutrition Hyderabad, National Institute of Nutrition . India council of research. 1993.
6. Stree Shakti Sangeetana. “We Were Making History ... ‘Life Stories of women in the Telangana People’s Struggle. New Delhi: Kai for Women. 1989.
7. Menon. Nivedita. Seeing Like a Feminist New Delhi: Zubaan-Penguin Books, 2012.
8. Yayaprabha, A. “Chupulu (states)”. Women Writing in India: 500BC to the Present. Volume II: The 20th Century Ed. Susie Tharu and K.Lalita Delhi: Oxford University Press. 1995.596-597.
9. Haveed Shayam and Anupam Maruhaar, “Women and Wage Discrimination in India: A Critical Analysis. ” I International journal of Humanities and Social Science Invention 2.4(2013)
10. Gautam. Liela and Gita Ramaswamy. “A Conversation between a Daughter and a Mother. “ Eroadsheet on contemporary Politics. Special Issue on Sexually and Harassment: Gender Politics on Campus Today. Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad Anveshi Research Center for Women’s Studies. 2014
11. Aodulali Sohaila. “I fought for My Life .. and Won. “ Available online at <http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohala-abdula/>
12. Jeganathan Pradeep. Partha Chattarjee (Ed). “Community, Gender and Violence Subaltern Studies XI”. Parmanert Black and Ravi Dayal Publishers, New Delhi, 2000.
13. Kkapadia. The Violence of Development: The Politics of Identity, Gender and Social Inequalities in india London: Zed Books. 2002
14. S.benhbabib. Situating the Self Gender, Community ana Postmoderism in Contemporary Ethics. London roullege. 1992
15. Virginia Woolf. A Room of One’s Own. Oxford Black Swan. 1992
16. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a human Face, Karachi Oxford University Press, 1997



ANURAG ENGINEERING COLLEGE

Civil Engineering (AN AUTONOMOUS INSTITUTION)

III YEAR I SEMESTER

COURSE STRUCTURE

Code	Subject Name	L	T/P/D	C
A55001	Concrete Technology	3	1	3
A55002	Design of RC Structures	4	1	4
A55003	Structural Analysis	3	1	3
A55004	Soil Mechanics	3	1	3
A55005	Engineering Geology	3	0	3
A55006	Managerial Economics & Financial Analysis	3	0	3
A55201	Concrete Technology Lab	0	3	2
A55202	Engineering Geology Lab	0	3	2
	Total	19	10	23

III YEAR II SEMESTER

COURSE STRUCTURE

Code	Subject Name	L	T/P/D	C
A56001	Design of Steel Structure	4	1	4
A56002	Environmental Engineering	4	1	4
A56003	Hydrology & Water Resources Engineering	4	1	4
A56004	Foundation Engineering	4	1	4
A56005	Transportation Engineering-I	4	0	4
	Elective I:			
A56006	1. Management Science	3	0	3
A56007	2. Construction Technology & Project Management			
A56008	3. Disaster Management and Mitigation			
A56009	4. Database Management Systems			
A56201	Soil Mechanics Lab	0	3	2
A56202	Advanced English Communication Skills Lab	0	3	2
	Total	23	10	27

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

T – Tutorial

P – Practical

D – Drawing

IV YEAR I SEMESTER**COURSE STRUCTURE**

S.No.	Code	Subject Name	L	T/P/D	C
1	A57001	Irrigation Engineering	3	1	3
2	A57002	Finite Element Methods	3	1	3
3	A57003	Estimating & Costing	4	1	4
4	A57004	Transportation Engineering-II	3	1	3
5	A57005	Remote Sensing & Geographic Information System	3	0	3
6	A57006 A57007 A57008	Elements of Earthquake Engineering Waste Management System Watershed Management System	3	0	3
7	A57201	Transportation Engineering Lab	0	3	2
8	A57202	Environmental Engineering Lab	0	3	2
		Total	19	10	23

IV YEAR II SEMESTER**COURSE STRUCTURE**

S.No.	Code	Subject Name	L	T/P/D	C
1	A58001	Ground Improvement Techniques	3	1	3
2	A58002 A58003 A58004	Advanced Structural Design Rehabilitation & Retrofitting of Structures Design & Drawing of Irrigation Structures	3	0	3
3	A58005 A58006 A58007	Prestressed Concrete Pavement Analysis & Design Air Pollution & Control	3	0	3
4	A58201	Seminar	0	6	2
5	A58202	Comprehensive Viva	0	0	2
6	A58203	Project Work	0	15	10
		Total	9	22	23

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

T – Tutorial

P – Practical

D – Drawing

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III Year B.Tech. CIVIL - I Sem

L	T / P / D	C
3	1	3

(A55001) CONCRETE TECHNOLOGY

Course Objectives:

- To impart the knowledge of the materials required for making the concrete
- To know the properties of various materials used in the concrete
- To provide the knowledge of mix design of concrete and the properties of green & hardened concrete.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Have the complete knowledge of types and properties of materials require for making concrete
- Know the properties of the green and hardened concrete
- Know the methods of finding the properties of materials and concrete
- Know the IS codal specifications of concrete and its materials.
- Have the knowledge of special concretes.

UNIT I

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

Water: Quality of mixing water.

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: Water / Cement ratio – Abram's Law – Gelspae ratio - Workability – Factors affecting workability – Measurement of workability by different tests – Setting time of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete

UNIT – III

MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete

mixes by various methods – BIS method of mix design-ACI method of mix design - British method.

ADMIXTURES: Types of Admixtures – Mineral and chemical admixtures- properties – dosages – effects – usage.

UNIT IV

HARDENED CONCRETE: Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

PROPERTIES OF HARDENED CONCRETE: 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

TESTS ON HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure test – Splitting tensile test – Pull-out test.

NDT: Codal provisions – Ultrasonic Pulse Velocity – Rebound Hammer Tests – Core cutting test.

UNIT V

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete , Polymer concrete – Types of Polymer concrete – High performance concrete – Self compacting concrete, Reactive powder concrete, Recycled Aggregate concrete .

TEXT BOOKS:

5. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition

6. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004

REFERENCES:

7. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi

8. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi

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III Year B.Tech. CIVIL - I Sem

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(A55002) DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Objectives:

- To provide the basic concepts of reinforced concrete design
- To impart the knowledge of various methods of design
- To provide the design of simple structural elements such as beams, Columns, footings & slabs

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Know the methods of design of R.C. Structural elements
- Know the IS codal provisions of various R.C. Structural elements
- Design the structural elements with an innovative ideas.

UNIT I

CONCEPTS OF RC DESIGN - Working stress method - Ultimate load method - Limit State method - Stress-strain curve for concrete, steel - Partial safety factor - Characteristic values - Stress Block parameters – IS:456 2000 provisions.

UNIT II

DESIGN DETAILING OF BEAMS: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

SHEAR, TORSION AND BOND: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, IS Code provisions. Design examples in simply supported and continuous beams, detailing.

UNIT III

DESIGN AND DETAILING OF RECTANGULAR SLABS: Design of one way, two way and continuous slabs using IS Codes.

Limit state of serviceability for deflection and cracking – IS Code provisions.

Introduction to yield line theory.

INTRODUCTION OF STAIRCASE AND DESIGN PRINCIPAL: Different types of staircase and design.

UNIT IV

DESIGN AND DETAILING OF SHORT AND LONG COLUMNS: Subjected to axial loads – Uniaxial and biaxial bending - IS Code provisions.

UNIT V

DESIGN AND DETAILING OF FOOTINGS: Different types of footings – Design of isolated, square, rectangular and circular footings - Introduction to combined footings.

TEXT BOOKS

1. Limit state design of RC structures by A. K. Jain.
2. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
3. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers
4. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi
5. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCE BOOKS

3. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
4. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
5. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
6. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

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III Year B.Tech. CIVIL - I Sem

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(A55003) STRUCTURAL ANALYSIS

Course Objectives:

- To provide the knowledge of Analysis of indeterminate structures.
- To provide the knowledge of conventional methods of structural Analysis

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Analyze the independent structures by using the conventional methods
- Have the knowledge of influence lines and moving loads & their applications for analyzing the simple structures

UNIT I

ARCHES: Types of arches – three and two hinged arches – Circular and parabolic arches – Yielding of supports – Effect of shortening of rib – Effect of temperature changes – Tied and linear arch.

UNIT II

MOMENT DISTRIBUTION METHOD: Introduction - Application to continuous beams with and without settlement of supports - Application to portal frames with and without sway.

UNIT III

SLOPE-DEFLECTION METHOD: Introduction - Derivation of slope deflection equations - Application to continuous beams with and without settlement of supports - Application to portal frames with and without sway (DOF not exceeding 3).

UNIT IV

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 - Deflections of determinate beams trusses using first theorem and unit load method – Castigliano's second theorem
– Analysis of indeterminate trusses and frames whose degree of redundancy is not exceeding two.

UNIT V

INFLUENCE LINES AND MOVING LOADS: Definition of Influence Line (IL) - IL for support reactions, shear force (SF) and bending moment (BM) at a section for ss beams with and without overhang - Load position for maximum reaction, SF and BM at a section due to moving point loads, udl longer than span and shorter than the span- two point loads, Several point loads - Maximum BM under a chosen point load - Absolute maximum BM for a girder - Influence lines for forces in members of Pratt and Warren trusses.

TEXT BOOKS

2. Basic structural Analysis by C.S. Reddy, Tata Mcgrawhill, New Delhi
3. Analysis of Structures-Vol I & Vol II by V.N. Vazirani & M.M.Ratwani, Khanna Publications, New Delhi.
4. Theory of structures by S. Ramamrutham, Dhanpat Rai & Sons, New Delhi.

REFERENCES BOOKS

5. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, Anand, Gujrat
6. Theory of Structures by Gupta, Pandit & Gupta; Tat Mc.Graw – Hill Publishing Co.Ltd., New Delhi.
4. Theory of Structures by R.S. Khurmi, S. Chand Publishers
5. Strength of Materials and Mechanics of Structures- by B.C.Punmia, Khanna Publications, New Delhi.
6. Introduction to structural analysis by B.D. Nautiyal, New age international publishers, New Delhi
7. Structural Analysis by V.D.Prasad Galgotia publications, 2nd Editions.
8. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
9. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal-Laxmi publications pvt. Ltd., New Delhi

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(A55004) SOIL MECHANICS

Course Objectives:

- To provide the basic knowledge of soil formation and the properties of various soils.
- To provide the knowledge load bearing capacity of various soils and the effect of seepage and permeability on soils
- To impart the knowledge of methods of improving the load bearing capacity of the soils.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the soil formation, the effect of permeability and seepage on soils.
- Know the methods of tests conducting on soils
- Know the lab tests and field tests on soils.
- Know the methods of improving the load bearing capacity on various soils

UNIT I

INTRODUCTION: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass-volume relationship – Relative density.

INDEX PROPERTIES OF SOILS: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils

UNIT II

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

EFFECTIVE STRESS & SEEPAGE THROUGH SOILS: Total, neutral and effective stresses – principle of effective stress - quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT III

SOIL EXPLORATION: need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test – pressure meter – planning of programmed and preparation of investigation report.

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 slopes of earth dams under different conditions.

UNIT IV

COMPACTION: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties. – Field compaction Equipment – compaction quality control.

CONSOLIDATION : Types of compressibility – immediate settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normal consolidation soil, over consolidated soil and under consolidated soil – preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation : square root time and logarithm of time fitting methods.

UNIT V

SHEAR STRENGTH OF SOILS: Importance of shear strength - Mohr – Coulomb Failure theories

– Types of laboratory strength tests – strength tests based on drainage conditions- strength envelopes – Shear strength of sands – dilatancy Critical void ratio – Liquefaction- shear strength of clays.

TEXT BOOKS

- 1 Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi
3. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
4. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES

3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt. Ltd, (2002).
5. Soil Mechanics – T.W. Lambe and Whitman, Mc-Graw Hill Publishing Company, Newyork.
6. Geotechnical Engineering by Purushotham Raj
7. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.

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(A55005) ENGINEERING GEOLOGY

Course Objectives:

- Role of geology and geophysics in Civil Engineering structures such as dams, reservoir, tunnels, excavations and manmade or natural environmental disasters etc.
- Impact of structural geology, ground water and weathering in civil engineering
- Geological and geophysical implications on and civil structures.

Course Outcomes:

- Know the application of geological, geophysical knowledge which will help in construction of resistant, long life civil structures on the earth.
- Distinguishing between strong and weak rock structures and making weak structures strong in construction of dams, tunnels, reservoirs etc.
- Understand that the engineering geology paves the way to produce strong geotechnical engineers which is back bone of civil structures.

UNIT I

Introduction: - Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of civil engineering construction 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 **mineralogy:-** definition of mineral, importance of study of minerals, different methods of study of minerals, advantages of study of mineral 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, agate, hornblende, muscovite, biotite, asbestos, chlorite, kyanite, garnet, talc, calcite, study of other common economics of minerals such as pyrite, hematite, magnetite, chromite, galena, pyrolusite, graphite, magnetite, and bauxite.

UNIT II

Petrology: - definition of rock. Geological classification of rocks into igneous, sedimentary and metamorphic rocks . Dykes and sills, common structures and textures of igneous, sedimentary and metamorphic rocks. Their distinguishing features, Macroscopic and microscopic study of granite, dolerite, basalt, pegmatite, laterite, conglomerate, sand stone, shale, limestone, gneiss, schist, quartzite, marble and slate. Rock excavation, stone aggregates.

UNIT III

Structural geology: - Indian stratigraphy and geological time scale. Out crop, strike and dip study of common geological structures, associating with rocks such as folds, faults unconformities and joints -their important types Geophysical studies importance of geophysical studies principles of geophysical study by gravity methods, Magnetic methods, electrical methods, seismic methods, radio methods, and geothermal method.

UNIT IV

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, Geology and 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, Factor contributing to the success of a reservoir. Geological factors influencing water tightness and the life of the reservoirs. Geo hazards, Ground subsidence.

UNIT V

Ground Water table, common types of ground water springs, cone of depressions, geological controls of ground water movement, ground water exploration, Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precaution to be taken for buildings construction in seismic areas, landslides, landslides hazards, water in landslides and their causes and effect measures to be taken to prevent the occurrence of importance of study of ground water . Earthquake and land slides Tunnels purpose of tunnelling effects of tunnelling on the ground role of geological consideration (litho logical, structural and ground water) in tunnelling over break and lining in tunnels, tunnels in rock. Subsidence over old mines, mining substances

TEXT BOOKS:

1. Principles of engineering geology by KVGK Ghkhale - BS publications
2. Engineering geology by N Chankesavulu, MAC Millan Punishers, 2nd edition India Lit. 01
3. Engineering geology by D Venkat Reddy, Vikas Publications.

REFERENCES:

F.G Bell Fundamental of engineering geology Butterworths publications., New Delhi. 1992

1. Krynine & Judd, Principles of Engineering Geology & Geotechnics CBS Publishers & Distribution
2. Foundations of Engineering Geology - Tony Waltham - Sport Press cry press Taylor and Francis.

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(A55006) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Objective: To explain the basic principles of Managerial Economics, Accounting and Current Business Environment underlying business decision making.

UNIT – I

Introduction to Managerial Economics: 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, methods of Demand Forecasting (Survey Methods, Statistical Methods, Expert Opinion Method, Test Marketing, Controlled Experiments, Judgmental Approach to Demand Forecasting)

UNIT – II

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economics of Scale.

Cost Analysis: Cost concepts, Opportunity Cost, Out of Pocket Costs vs. Imputed Costs. Break – Even Analysis (BEA) – Determination of Break – Even Point (simple problems) – Managerial Significance and limitations of BEA.

UNIT – III

Introduction to Markets & Pricing Policies:

Market structures: Types of Competition, Features of Perfect Competition, Monopoly and Monopolistic Competition, Price – Output determination in case of Perfect Competition

Objectives and Policies of Pricing – Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two – Part Pricing, Block Pricing, Peak Load Pricing, Cross Subsidization.

UNIT – IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working Capital requirements,

Nature and scope of Capital Budgeting, features of Capital Budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method, Profitability Index, Internal Rate of Return (simple problems)

UNIT – V

Introduction to Financial Accounting: Double – Entry Book Keeping, Journal, Ledger, and Trial Balance – Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and Quick Ratio), Activity Ratios (Inventory Turnover Ratio and Debtor Turnover Ratio), Capital Structure Ratios (Debt – Equity, Interest Coverage Ratio), and Profitability Ratios (Gross Profit Ratio, Net Profit Ratio, Operating Profit Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri, Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheshwari, Managerial Economics, Sultan Chand, 2009.

REFERENCES:

1. Raghunatha Reddy & Narasimhachary, Managerial Economics & Financial Analysis, Scitech, 2009.
 2. V. Rajasekarn & R. Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
 3. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.
 4. Domnick Salvatore, Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
 5. Subhash Sharma & M. P. Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2008.
 6. S. N. Maheshwari & S. K. Maheshwari, Financial Accounting, Vikas 2008.
 7. Truet and Truet, Managerial Economics; Analysis, Problems and Cases, Wiley, 2009.
 8. Dwivedi, Managerial Economics, Vikas 2009.
 9. M. Kasi Reddy, S.Saraswathi, Managerial Economics and Financial Accounting, PHI, 2007.
 10. Erich A. Helfert, Techniques of Financial Analysis, Jalco, 2007.
- Codes / Tables:**
Present Value Tables need to be permitted into the Examination Hall.

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(A55201) CONCRETE TECHNOLOGY LAB

Course Objectives:

- To provide the knowledge of various tests conducted on cement, aggregates and concrete.
- To provide the knowledge of IS codal provisions.
- To know various materials used in the concrete and their properties

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand conducting the tests on various materials used in making the concrete
- Do the consultancy work on concrete materials

LIST OF EXPERIMENTS

I. Tests on Cement

4. Fineness and normal consistency of cement
5. Initial setting time and final setting time of cement
6. Specific gravity of cement
7. Compressive strength of cement

II. Tests on Aggregate

5. Fineness modulus of fine and coarse aggregate
6. Specific gravity and bulk density of fine and coarse aggregate
7. Bulking of sand
8. Shape test of Aggregate

II. Tests on Concrete

4. Workability tests on concrete.
5. Young's modulus and compressive strength of concrete
6. Splitting tensile strength of concrete
7. Flexural strength of plain concrete
8. Non-destructive testing on concrete (for demonstration)

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(A55202) ENGINEERING GEOLOGY LAB

COURSE OBJECTIVES:

- Determination of Physical and Optical properties of rocks and economic ore minerals
- Delineation of geological subsurface structures by solving structural problems
- Understanding features of geological maps and its applications.

COURSE OUTCOMES:

On successful completion of this course, it is expected that the students will be able to,

- Student can identify important rocks, minerals, ore minerals based on Physical and optical properties to distinguish between strong and weak rocks
- Students can unravel the surface and subsurface geological structures for taking appropriate decision to either construct or to strengthen the existing geological structures for raising civil structures

List of Experiments

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 and 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 geological section
4. Simple strike and dip problems

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(A56001) DESIGN OF STEEL STRUCTURES

Course Objectives:

- To provide the knowledge various materials used and their properties in the steel design
- To provide the knowledge of various connections involved in steel structures
- To provide the knowledge of various loads applied and the design of steel roof trusses.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Have the knowledge of various steels used in the construction of steel design and their properties.
- Have the thorough knowledge of IS codal provisions and the design of various structural steel elements such as beams, girders, columns, columns bases & trusses.
- Design various connections involved in the steel structures.

UNIT I

Materials - Composition of steel - Types of structural steel - Mechanical properties of steel - Concept of plasticity - Yield strength - Loads and combinations - Local buckling behavior of steel - Concept of limit state design - Limit states - Design strengths - Deflection limits – Serviceability - Stability check.

Bolted connections - Riveted connections - IS:800 2007 - Specifications - Design strength - Efficiency of joint - Prying action.

Welded connections - Types of welded joints - Specifications - Design requirements. **Design of tension members** - Design strength - Design procedure – Splice - Lug angle.

UNIT II

Design of compress members - Buckling class - Slenderness ratio/Strength design - Design of angle section and rolled steel column sections.

Design of Columns - Laced and battened columns - Splice. **Column Bases:** Slab base - Gusseted base.

UNIT III

Design of beams - Plastic moment - Bending and shear strength / buckling - Built-up sections - laterally supported beams.

Beam Connections - Design of eccentric connections – Framed - Stiffened / seated connection.

UNIT IV

Design of welded plate girder - Elements - Economical depth - Design of main section - Connections between web and flange - Design of stiffeners - Design of web splice & flange splice.

UNIT V

Design of roof trusses - Types of roof trusses - Loads on trusses - Estimation of wind loads as per IS 875 - Purling design - Truss design - Design of joints and end bearings.

TEXT BOOKS

5. Design of steel structures – N.Subramaniam, oxford university press -2009.
6. Limit state design of steel structures, S.K. Duggal, Tata Mcgraw –Hill, 2010.
7. Design of steel structures Vol I&II by Ramachandra, Standard Publications.

REFERENCE BOOKS

8. Design of steel structures by K.S Sairam, person education
9. Design of steel structures Edwin H.gaylord, Jr. charless N.gaylord and jams stallmeyer tata Mc Graw – hill education pvt ltd
10. Design of steel structures by S.S.bhavikatti, I.K Int. Publication House, New Delhi, 2010

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(A56002) ENVIRONMENTAL
ENGINEERING

Course Objectives:

- To provide the knowledge of source of water and its distribution.
- To impart the knowledge of various treatment required for potable water
- To provide the knowledge of characteristics of sewage and its treatment.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Have the complete knowledge of source of water, its demand and standards.
- Have the knowledge of various treatment methods in treating the drinking water and sewage
- Design the various treatment plants and water distribution system

UNIT I

Introduction: waterborne diseases – protected water supply – populations forecasts, design period – water demand – types of demand – factors affecting – fluctuations – fire demand – storage capacity – water quality and testing – drinking water standards.

Sources of water: Selection of water source based on quality, quantity and other considerations – intakes – infiltration galleries, confined and unconfined aquifers distribution system – requirements – methods and layouts.

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 fluctuations 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.

UNIT III

Distribution systems – types of layouts of distribution systems – design of distribution system

– Hardy cross and equivalent pipe methods and service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meter – laying and testing of pipe lines – pump house.

Conservancy and water carriage systems – sewage and storm water estimation –

time of concentration – storm water over flows combined flow.

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

UNIT IV

Characteristics of sewage – cycle of decay – decomposition of sewage, examination of sewage – BOD – COD. Equations , design of sewers – shape and materials – sewer appurtenances man holes – inverted siphon – catch basins – fusing tanks – ejectors, pumps and pump houses and house drainage – components requirements – sanitary fittings – traps – one pipe and two pipe systems of plumbing ultimate disposal of sewage – sewage farming – dilution.

UNIT V

Waste water treatment plant- Flow diagram – primary treatment design of screens – grid chambers – skimming tanks –sedimentation tanks – principles of design – biological treatments – trickling filters – standard and high rate - Construction and design of oxidation ponds. Sludge digestion tanks – factor affecting – design of digestion tanks – sludge disposal by drying – septic tanks working principles and design – soak pits.

TEXT BOOKS

1. Water supply and sanitary engineering by G.S.birdi, dhanpath rai & sons publishers
2. Water supply engineering, vol –I, waste water engineering vol –II, B.C punmia, ashok jain & arun jain, lakshmi publications new Delhi
3. Elements of envirmetal engineering by K.N duggal, S.chand publishers

REFERENCE BOOKS

6. Water and waste water technology by mark J hammar and mark J.hammer Jr
7. Water and waste water technology by steel
8. Water and waste water engineering by fair geyer and okun
9. Waste water treatment – concepts and design approach by G.L karia and R.A Christian , PHI
10. Waste water engineering by Metcalf and eddy
11. Unit operations in environmental engineering by R. elangovan and M.K.saseetharan, new age international

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(A56003) HYDROLOGY & WATER RESOURCES ENGINEERING

Course Objectives:

- To provide the knowledge of hydrology and hydrologic cycle and its applications.
- To provide the knowledge of ground water occurrence and the importance of irrigation.
- To impart the knowledge of design of irrigation canals.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Have the knowledge of rain water, ground water and their utility.
- Design the irrigation structures and canals.

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-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices..

UNIT II

Distribution of Runoff-Hydrograph Analysis Flood Hydrograph – effective Rainfall - 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, transmissibility 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, 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, estimation of consumptive use, Duty and delta, factors

affecting duty- Design discharge for 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, 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

5. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi
6. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi

REFERENCE BOOKS

4. Elementary hydrology by V.P.Singh, PHI publications.
5. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
6. Irrigation Water Management by D.K. Majundar, Printice Hall of India.

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(A56004) FOUNDATION ENGINEERING

Course Objectives:

- To provide the knowledge of stress distribution in soils, methods of finding the load bearing capacity of soils and settlement of soils.
- To provide the knowledge of various kinds of foundations.
- To impart the knowledge of cofferdam, caissons and dewatering technique.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Know the knowledge of stress distribution in soils due to various kinds of loads
- Know the various methods of load bearing capacity of soils and settlement of soils
- Design the various kind of foundations, cofferdams and caissons.

UNIT I

STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point loads, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

UNIT II

BEARING CAPACITY OF SOILS: Terzaghi's equation for bearing capacity in soils – its modification for continuous, square, rectangular and circular footings, general and local shear failure conditions. Plate load test as per IS specification. Allowable bearing capacity. Standard penetration test and use of N values for estimating soil condition and bearing capacity. Proportioning of footings and rafts.

SETTLEMENT ANALYSIS: Computation of pressures before loading and after loading. Estimation of settlement – ultimate and after any given period. Correction for construction period.

UNIT III

SHALLOW FOUNDATIONS – BEARING CAPACITY CRITERIA: Types of choice of foundation – location of depth – safe bearing capacity – Terzaghi, Meyerhof, Skempton IS methods.

SHALLOW FOUNDATIONS – SETTLEMENT CRITERIA: Safe bearing pressure based on N value – allowable bearing pressure: safe bearing capacity – plate load test – allowable settlements of structures.

UNIT IV

PILE FOUNDATION: Types of piles – load carrying capacity of piles based on static pile formulae – Dynamic pile formula –pile load tests- load carrying capacity of pile groups in sands and clays – settlement of pile groups.

WELL FOUNDATION: Types – different shapes of wells – components of wells – functions and design criteria – sinking of wells – tilts and shifts.

UNIT V

COFFER DAMS: Earth embankments, cantilever sheet piles, braced coffer dams, double wall coffer dams, cellular, coffer dams – circular, diaphragm type, general description and construction methods.

CAISSONS: Types of caissons such as open, pneumatic and box caissons (floating caissons), General description and construction methods.

DEWATERING TECHNIQUES: Sumps, ditches, well points, deep wells.

TEXT BOOKS

13. Basic and applied soil mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).

14. Das, B.M., (1999) Principles of foundation engineering, 6th edition (Indian edition), Thomson Engineering

15. Geotechnical Engineering : principles and practices of soil mechanics and foundation engineering by VNS Murthy, Taylor & francis group.

REFERENCE BOOKS

1. Analysis and design of sub structures – swamy saran, oxford and IBH publishing company pvt ltd 1988.

2. Geotechnical engineering by S.K gulhatti & manoj datta – tata Mc.graw hills publishing company new delhi 2005

3. Teng, W.C – foundation design, prentice hall, new jersy

4. Bowles, J.E., (1988) foundation analysis and design – 4th edition, Mc.graw hills publishing company newyork.

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(A56005) TRANSPORTATION ENGINEERING-I

Course Objectives:

- To provide the knowledge of highway development, planning and its geometric design
- To provide the knowledge of traffic regulations and its management.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Have the knowledge of highway planning, survey involved and its geometric design
- Have the knowledge of basic parameter of traffic regulations and management.
- Have the knowledge of pavement design as per the IRC codal provisions

UNIT I

HIGHWAY DEVELOPMENT AND PLANNING: High way development in India – necessity for high way planning – different road development plans. Classification of roads – road network patterns – high way 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 – high way cross section elements – sight distance elements – stopping sight distance, over taking sight distance and intermediate sight distance – design of horizontal alignment – design of super elevation and extra widening – design of transition curve – design of vertical alignments – gradients – vertical curves. Typical cross sections for different types of roads

UNIT III

TRAFFIC ENGINEERING: Basic parameters of traffic – volume , speed and density – traffic volume 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 infrastructures and safety audits

UNIT IV

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

UNIT V

TRAFFIC INTERSECTION DESIGN: Types of intersections – conflicts at intersections – types of at – grad intersections – channelization: objectives – traffic islands and design criteria – types of grade separated intersections – rotary

intersections – concept of rotary and design criteria – impact of geometrics on intersection with reference safety , operational capacity

PAVEMENT DESIGN: Pavement types, factors to be considered for pavement design – Concept of layer theory, design wheel load, ESWL, EALF, vehicle damage factor, design by CBR developed by US corps of Engineers, IRC cumulative standard axiles methods (IRC 37: 2002).

TEXT BOOKS

1. Highway Engineering by S.K Khanna & C.E.G. Justo, nemchand & bros ., 7th edition (2000).
2. Highway Engineering Design by L.R.Kadiyali, Lal – khanna publications.

REFERENCE BOOKS

1. Highway Engineering by S.B.Bindra, Dhanpat Rai & Sons Publications, 4th edition (1981)
2. Traffic Engineering and Transportation Planning – Dr.L.R.Kadyali, khanna publications – 6th edition 1997.
3. Principles of Traffic Engineering by Garber & Hoel, Cengage Learning.

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(A56006) MANAGEMENT SCIENCE (Elective-I)

Objective: To provide students a wonderful opportunity of learning the basics and concepts of management functions like Marketing, HRM, Operations Management and an Organization environment.

Unit-I

Introduction to Management: Entrepreneurship and organization – Nature and importance of

Management, Functions of Management, Taylor's scientific Management Theory, Fayol's principles of management, Maslow's theory of Human Needs, Douglas Mc Gregor's Theory X and Theory Y, Herzberg's Two factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social Responsibilities of Management. Types of organization structures.

Unit-II

A) Operations Management: Principles and Types of Plant Layout-Methods of production(Job, batch and Mass production), Work Study – Basic procedure involved in Method Study and Work measurement-Statistical Quality Control: X chart, R chart, C chart,

P chart, (simple problems), Acceptance Sampling, Deming's contribution to quality.

B) Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – Supply Chain Management.

Unit –III

A) Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower Planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

B) Marketing: Functions of Marketing, Marketing Mix, Marketing strategies based on Product Life cycle, Channels of distribution.

Unit –IV

Project Management(PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method(CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing.(simple Problem)

Unit –V

Strategic & Contemporary Management Practices: Mission, Goals, objectives, policy, strategy, Programmes, Elements of Corporate Planning process, Environmental

Scanning, SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Basic concepts of Just-In-Time(JIT) system, Total Quality Management(TQM), Six Sigma and Capability Maturity Model(CMM) levels, Value chain Analysis, Enterprise

Resource Planning(ERP), Performance Management, Business Process Outsourcing(BPO), Business process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

TEXT BOOKS:

1. Aryasri: Management Science, TMH, New Delhi, 2009

REFERENCES:

1. Stoner, Management, Pearson, 2009.
2. Kotler Philip & Keller Kevin Lane: Marketing Management PH, 2009.
3. Koontz, Weihrich & Aryasri: Principles of Management, TMH, 2009.
4. Thomas N. Duening & John M. Ivancevich Management-Principles and Guidelines, Cengage, 2009.
5. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2009.
6. Memoria & S.V.Ganker, Personnel Management, Himalaya, 2009.
7. Schermerhorn: Management, Wiley, 2009
8. Parnell: Strategic Management, Biztantra, 2009.
9. L.S. Srinath: PERT/CPM, Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science, TMH, 2007

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(A56007) CONSTRUCTION TECHNOLOGY AND PROJECT MANAGEMENT (Elective-I)

Course Objectives:

- To impart the knowledge of construction technology, schedule, methods involving the construction of structures
- To provide the knowledge of construction equipment, quality control, project planning and its scheduling

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Handle the project work with proper planning and scheduling
- Know the methods of management of the project to be completed within the stipulated time
- Have the knowledge of equipment involved and technology used in the construction a project
- Use the innovative methods of construction of a project.

UNIT-I

Fundamentals of construction technology- Construction activities – Process – Construction schedule – Construction records – Documents – Quality – Safety – Codes and regulations.

Construction method – Earthwork – Piling – Concrete and concreting – Form work – Fabrication and erection.

UNIT-II

Mechanized construction – Construction equipment – Equipment economics – Excavators – Rollers – Dozers – Scrapers – Handling equipment – Concrete equipment – Handling equipment – Cranes Draglines and Clamshalls.

UNIT-III

Quality control – Assurance and safety – ISO-900 Quality systems – Principles on safety – Personnel, Fire and Safety – Environment protection – Concept of green building.

UNIT-IV

Contract management – Project estimation – Project estimation – Contract document – Classification – Bidding – Procurement process. Construction planning – Project planning techniques – Planning of man power – Material, Equipment and Finance.

UNIT-V

Project scheduling – PERT – CPM, Resource leveling, Construction claims, Dispute and Project closure – Source of claim – Claim management – Dispute resolution – Arbitration – Construction closure – Contract closure – Documentation.

TEXT BOOK:

1. Construction Technology by subir k Sarkar, Subhajit Saraswati / Oxford University Press 2009
2. Construction Project Management – Theory and practice, Nirajjha Pearson Education 2010.

REFERENCES:

1. Construction planning, Equipment and Methods by Peurifacy. Schexnayder Shapira TMH, 2010.

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(A56008) DISASTER MANAGEMENT AND MITIGATION (Elective-I)

Course Objectives:

- To provide the knowledge of environmental hazards and disasters and their mitigation techniques.
- Know the emerging approaches in disaster management.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Have the knowledge of occurrence of environmental hazardous and its impact on social life.
- Know the techniques of managing the disasters occurred due to hazards.

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.

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-II

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-III:

Exogenous hazards/ disasters-Infrequent events-Cumulative atmospheric hazards/disasters, Infrequent event : Cyclones –Lighting-Hailstorms, Cyclones: Tropical cyclones & Local storms – Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/disasters: Floods – Droughts- Cold waves –Heat waves

Floods: Causes of floods- Flood hazards India –Flood control measures(Human adjustment, perception & mitigation), Droughts: Impacts of droughts- Drought hazards in India- Drought control measures – Extra planetary Hazards/ Disasters- Man induced Hazards/Disasters-physical hazards/Disasters

Soil Erosion: 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-VI

Emerging approaches in Disaster Management- Three Stages

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

Natural Disaster Reduction & Management

- a) Provision of Immediate relief measures to disaster affected people
- b) Prediction Hazards & Disasters
- c) Measures of adjustment to natural hazards

UNIT-V

Disaster Management- An integrated approach for disaster preparedness, mitigation & awareness.

Mitigation –Institutions –discuss the work of following Institution.

- a. Meteorological observatory
 - b. Seismological observatory
 - c. Volcanology institution
 - d. Hydrology Laboratory
 - e. Industrial Safety inspectorate
 - f. Industrial Safety inspectorate
 - g. Chambers of Architects
 - h. Engineering Council
 - i. National Standards Committee
- Integrated planning –Contingency management preparedness
- a) Education on disasters
 - b) Community involvement
 - c) The adjustment of Human Population to Natural hazards & disasters Role of Media Monitoring Management- Discuss the programme of disaster research

& mitigation of disaster of following organizations.

- a) International Council for Scientific Unions (ICSU)- Scientific committee on problems of the Environment (SCOPE) International Geosphere - Biosphere programme (IGBP)
- b) World federation of Engineering Organizations (WFED)
- c) National Academy of Sciences
- d) World Meteorological organizations (WMO)
- e) Geographical Information System(GIS)
- f) International Association of Seismology & physics of Earth's Interior (IASPEI)
- g) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNEP.

Mitigation

- a) Regional survey of land Subsidence, coastal disaster, Cyclonic disaster and disaster in hills with particular reference to India
- b) Ecological planning for sustainability and sustainable development in India, Sustainable rural development. A remedy to disasters-role of panchayat in disaster mitigations
- c) Environmental policies and programs in India-Institutions and National centers for natural disaster reduction, Environmental legislation, Awareness, conversion movement, education and training.

TEXT BOOK:

Disaster Mitigation: Experiences and Reflections by Pardeep Sahni

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, GF The Environment as Hazards, oxford, New York, 1978
4. R.R Singh (Ed)Disaster Management, Rawat Publication, New Delhi, 2000
5. H.K. Gupta(Ed) Disaster Management, Universiters Press, India,2003
6. R.R. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender, Disaster Management in Hills , Concept publishing co., New Delhi,2003
8. A.S. Arya Action plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA publication New Delhi, 1994
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA,New Delhi,2001

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(A56009) DATABASE MANAGEMENT SYSTEM (Elective-I)

UNIT I – Data base system applications, data base system Vs file system – view of data – Data abstraction – Instances and Schemas – data models – the ER Model – Relational Model

– Other Models – Database languages – DDL – DML – Database access for applications programs – data base Users and Administrator – Transaction Management – data base system structure – Storage Manager – the Query Processor. History of Data Base Systems: Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationship and Relationship sets – Additional features of ER model – Concept Design with the ER Model – Conceptual Design for Larger enterprises.

UNIT II – Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity Constraints – Querying relational data – Logical data base design-Introduction to views – Destroying / altering Tables and views. Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's- AND, OR and NOT – Impact on SQL **Constructs** – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT III – Schema refinement – Problems caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join refinement in Data base Design – Multi valued Dependencies – Forth Normal Form. Transaction Concept – Transaction State – Implementation of Atomicity and Durability – Concurrent – Executions – Serializability – Recoverability- Implementation of Isolation – Testing for Serializability – Lock – Based Protocols – Timestamp based protocols – Validation – Based protocols – Multiple Granularity.

UNIT IV – Recovery and Atomicity – Log – Based Recovery – Recovery with concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage – Advance Recovery systems – Remote Back up systems.

UNIT V- Data on External Storage – File Organization and Indexing – Cluster Indexes , Primary and Secondary Indexes – Index data structures – Hash Based Indexing – Tree base Indexing – Comparison of file organizations – Indexes and Performance Tuning – Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees : A Dynamic Index Structure.

TEXT BOOKS:

1. Data Base Management Sytems, Raghurama Krishnan, Johannes Gehrke. TATA McGraw Hill 3rd Edition.
2. Data base system concepts, Silberschatz Korth, McGraw Hill, V Edition.

REFERENCES:

1. Data base systems design, Implementation and Management, Peter Rob and Carols Coronel 7th edition.
2. Fundamentals of database systems, Elmasri Navrate Pearson Education.
3. Introduction to database systems, C.J.Date Pearson Education.
4. Orcale for Professionals, The X Team, S.Shah and V.Shah, SPD.
5. Database systems using Orcale: A Simplified guide to SQL and PL/SQL Shah, PHI.
6. Fundamentals of Database Management Systems, M.L.Gillenson, Wiley Student Edition.

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(A56201) SOIL MECHANICS LAB

Course Objectives:

- To impart the knowledge of various tests conducted to know the properties of soils
- To impart the knowledge of field tests involved in knowing the soil properties

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Have the knowledge of field tests and lab tests conducted on soils.
- Get the complete knowledge of properties of various soil.
- Have the innovative methods of conducting the tests on soils.
- Do the consultancy work on soil properties.

LIST OF EXPERIMENTS

11. Attenberg Limits (Liquid Limit, Plastic Limit)
12. Determination of specific gravity of soil
13. Grain size distribution by sieve analysis
14. Field density by core cutter method
15. Field density by sand replacement method
16. Permeability of soil by constant and variable head test methods
17. Standard Proctor's compaction tests
18. Modified Proctor's compaction tests
19. CBR Test
20. Unconfined compression tests
21. Triaxial compression test
22. Direct shear test
23. Vane shear test
24. Consolidation Test

Note: Any 12 experiments may be completed

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(A56202) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction

The introduction of the English Language 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 an integrated theory and lab course to enable students to use good

English and perform the following:

- Gather ideas and information, to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. Objectives:

This Lab focuses on using computer-aided multimedia 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.

3. Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

1. **Vocabulary Building** – synonyms and antonyms, Word Roots, One-Word Substitutes, Prefixes and Suffixes, Study of Word Origin, Analogy, Idioms and Phrases.
2. **Reading Comprehension** – Reading for Facts, Guessing meanings from context, Scanning, Skimming, Inferring Meaning, and Critical Reading.
3. **Writing Skills** –Structure and presentation of different types of writing - Resume Writing /E-Correspondence/Statement of Purpose.
4. **Technical Writing**- Technical Report Writing, Research Abilities/Data Collection/Organizing Data/Tools/Analysis.
5. **Group Discussion** – Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Coherence.
6. **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/Seminars, Written Presentations through Projects/ PPTs/e-mails etc.
7. **Interview Skills** – Concept and Process, Pre-Interview Planning, Opening Strategies, Answering Strategies, Interview through Telephone and Video-Conferencing.

4. Minimum Requirement: The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

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

5. Suggested Software:

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

Suggested Software:

- Clarity Pronunciation Power – part II □
- Oxford Advanced Learner's Compass, 7th Edition □
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dream tech.
- TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS) □
- The following software from train2success.com □
 - i. Preparing for being Interviewed,
 - ii. Positive Thinking,
 - iii. Interviewing Skills,
 - iv. Telephone Skills,
 - v. Time Management
 - vi. Team Building,
 - vii. Decision making
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
10. English for Technical Communication for Engineering Students, Aysha Vish hwamohan, Tata Mc Graw-Hil 2009.
11. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/Cambridge University Press.
12. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

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(A57001) IRRIGATION ENGINEERING

Course Objectives:

- To enable the students understand the purpose and functions of the various irrigation structures.
- To understand various theories involved and design principles of irrigation structures.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the various types storage reservoirs, dams, canals and diversion head works.
- Know the causes of failure of water storage structures
- Design the simple irrigation structure.

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, principles of design of distributory and head regulators, Canal Cross Regulators -canal outlets, types of canal modules, proportionality, sensitivity and flexibility Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage. Design of Type II Aqueduct (Under Tunnel)

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

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(A57002)FINITE ELEMENT METHODS

Course Objectives:

- To equip the students with the Finite Element Analysis fundamentals.
- To enable the students to formulate the design problems into FEA.
- To introduce basic aspects of finite element technology, including domain discretization, polynomial interpolation, application of boundary conditions, assembly of global arrays, and solution of the resulting algebraic systems.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- To know the analyse the complex structures with proper idealization
- To have a basic idea to work with software packages like ANSYS and SAP

UNIT I : Introduction – one dimensional problems

Concepts of FEM, steps involved, matrix displacement method vs FEM, element definition: interpolation functions, stress-strain relationship, strain displacement relationship, stiffness matrix and load vector from the energy principles, stiffness matrix for a two-noded and three-noded bar elements and their shape functions, equivalent nodal force vector due to surface and body forces, analysis of 1D structures using 2-noded and 3-noded bar elements.

UNIT II: CST element – two dimensional problems

plane stress and plane strain problems, stiffness matrix of constraint strain triangle (CST) element, shape functions, equivalent nodal force vector, applications, introduction to linear strain triangle.

UNIT III: Shape functions

Shape functions for 1D elements in Cartesian coordinators of 2-noded and 3-noded elements, methods of constants, Lagrange polynomial, in natural coordinates. Shape functions for 2D elements: rectangular elements of Lagrange family, Serendipity family, shape functions of triangular elements in area coordinator. Introduction to shape functions of 3D element, Conditions which shape functions should satisfy.

UNIT IV: Isoparametric elements and numerical integration

isoparametric concept, isoparametric elements for 1D analysis, isoparametric elements for 2D analysis, stiffness matrix for linear isoparametric element, equivalent nodal force vector, numerical integration, applications, convergence and compatibility requirements.

UNIT V:

Two-noded beam element stiffness matrix of a beam element from a cubic polynomial, Hermitian polynomials and their properties, equivalent nodal force vector. Rayleigh-Ritz method of analysis or 1D problems due to self height and due to surface loads. Introduction to axi-symmetric analysis.

TEXT BOOKS:

1. Introduction to finite element method by P.N. Godbole, I.K. International Publishing House Pvt. Ltd., New Delhi.
2. Introduction to finite elements in engineering by T.R. Chandrupatla and A.D. Belegundu, Prentice Hall
3. The finite element method, O.C. Zienkiewicz, Tata McGraw-Hill Publishing Company, New Delhi.

REFERENCES:

1. C.S. Krishna Murthy, Finite Element Analysis, Mc Graw Hill., 1997
2. C.S. Desai and J.F. Abel, Introduction to the Finite Method, Van Nostrand, 2002

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(A57003) ESTIMATING AND COSTING

Objectives:

- To study the material and cost estimation of buildings
- To study the estimation of roads covering culverts and bridges
- To study the rate analysis
- To bring about an exposure to field problems associated with roads/bridge marking and Estimation of roadwork quantities

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- The student will have an idea about rate analysis and costing for different stages of work
- Will have knowledge on various methods of valuations and estimating cost depreciations.
- Will be able to estimate labour required stage wise
- Will have complete knowledge on various types of contracts and tenders.

UNIT – I : Working out the detailed estimate for the following:

- i) Flat roof building (load bearing, RCC & Steel framed structure)
- ii) Bituminous and C.C. Road work including earthwork
- iii) Single pipe culvert and single cell rectangular box culvert.
- iv) Septic tank
- v) Irrigation canal work including earthwork

UNIT – II: Estimation of steel quantities for the following R.C. Works

- i) Slabs, Beams and Columns
- ii) Footings - Rectangular, isolated and combined
- iii) Stair Case
- iv) Overhead rectangular water tank

UNIT – III: Preparation of analysis of rates and theoretical requirements of materials as per the standard data of APDSS for the following:

- i) Major items of works of a building
- ii) All items of work of bituminous and concrete road works

UNIT – IV : As per APDSS

- i) General and detailed specification of works
- ii) Departmental procedure for construction work
- iii) Types of estimates

UNIT – V :

- i) Types of contracts, essentials of contract, condition of contract and recent developments.
- ii) Tender - Tender from, Tender documents, Tender notice, e-tender work order.
- iii) Earnest money, Security deposit and new developments
- iv) Measurement book and Muster roll. Concept of PPP projects, BOT and BOOT projects

TEXT BOOKS:

1. B.N. Dutta, Estimating and Costing in Civil Engineering – Theory and Practice, S. Dutta & Co., Lucknow, 2002.
2. M. Chakraborti, Estimating, Costing and Specifications in Civil Engineering, (Published by Author), 2002.
3. Jagjit Singh, Estimating and Costing in Civil Engineering, Galgotia Publications, New Delhi, 1996.
4. Patil, B.S. (2009), Civil Engineering Contracts and Estimation, Universities Press III Edition, Hyderabad.

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(A57004) TRANSPORTATION ENGINEERING-II

Course Objectives:

- To provide the basic knowledge on importance and components of various transportation systems like railways and airways
- To provide the knowledge on the geometric features of railways along with computational capabilities of the same.
- To provide the knowledge on importance of airway systems and airport planning studies
- To provide the knowledge on airport configurations and its alliance

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Identify different components of railway track and select right materials for construction
- Compute the various geometric features of railways for a given set of requirements.
- Understand the importance of airway system and characteristics of aircrafts and involve in planning of airport facilities.
- The students will be able to understand the facilities at airports construct the same.

RAILWAY ENGINEERING

UNIT – I

Introduction: Role of railways in transportation; Comparison of railway and highway transportation; Development of railway systems with particular reference to India; Classification of railways. Railway Track:

Permanent way: Gauges in Railway track, Railway track cross - sections; Coning of wheels.

UNIT – II

Rails & Rail Joints : Functions of rails; Requirements of rails; Types of rails sections; Standard rail sections; Length of rails; Rail failures; Wear on rails. Requirements of an ideal joint; Types of rail joints; Welding of rails.

Sleepers: Functions of sleepers; Requirements of sleepers; Classification of Sleepers - Timber sleepers, Metal sleepers & Concrete sleepers; Comparison of different types of sleepers. Fish plates, failure of fish plates.

Ballast: Functions and requirements of ballast; Types of ballast; Renewal of ballast.

AIRPORT ENGINEERING

UNIT – III

Introduction: 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.

UNIT - IV Airport Planning

1. Types of airport planning studies
2. Forecasting in aviation and airport planning

UNIT – V Airport Configuration

1. Introduction of Airport configurations
2. Analysis of wind
3. Runway configurations
4. Taxiway configurations
5. Air traffic control facilities
6. Air safety & Regulation issues

TEXT BOOK

- 1 Khanna S K, Arora M G and Jain S S, Airport Planning and Design, Nemchand and Brothers, Roorkee, 1994.
2. Railway Engineering by Rangwala, Charotar Publishing House.

REFERENCES

1. Air Transportation Planning & design – Virendhra Kumar & Statish Chandhra – Gal Gotia Publishers (1999).

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(A57005) REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM

Course Objectives:

- To understand the principles involved and applications of RS & GIS
- To interpret images
- To analyse spatial & attribute data
- To know the spatial analysis method

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Use the RS & GIS applications in various aspects
- Analyse the energy interaction in the atmosphere and earth surface features
- Interpret the images for preparation of thematic maps
- Analyse spatial & attribute data for solving spatial problems
- Know the GIS spatial analysis method.

UNIT – I

Introduction to Photogrammetry: Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

Remote Sensing – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT – II

Remote Sensing – II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III

Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS. Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – IV

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data. Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential

indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics

UNIT – V

RS & GIS applications: Transportation Watershed management, Geology, Emergency Management, Agriculture, Land use and Land cover Mapping.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principals of Geo physical Information Systems – Peter A Burrough and Rachael A. Mc Donnell, Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yongg, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. GIS by Kang – tsung chang, TMH Publications & Co.,
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & So

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(A57006) ELEMENTS OF EARTHQUAKE ENGINEERING (ELECTIVE-II)

Course Objectives:

- To provide the knowledge of occurrence of earthquakes and their effects on structures.
- To know the design principle of structures due to earthquake (EQ) loads.
- To understand the provisions incorporated in the IS 1893 and IS 13920.
- To impart the knowledge of behaviour of structural and non- structural elements due to earthquake forces

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- The student is able to estimate the lateral loads on structures and design the structures for gravity and lateral load combinations.
- Understand the design principles given in the Codes for EQ resistant design of structures.
- Know the importance of ductile detailing required for reducing the EQ effects on structures.

UNIT-I

Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults-Plate tectonics- Seismic waves- Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India. Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom-Continuous system-Lumped mass idealization-Oscillatory motion- Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system- undamped and damped-critical damping-Logarithmic decrement-Forced vibrations.

UNIT – II

Conceptual design: Introduction-Functional planning-Continuous load path-Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings- flexible buildings-framing systems-choice of construction materials unconfined concrete-confined concrete-masonry-reinforcing steel - Lateral load resisting systems. Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT – III

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members- Structural models for frame buildings- IS code (IS 1893) based methods

for seismic design- retrofitting- Vertical irregularities- Plan configuration problems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear. Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT – IV

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures.

UNIT – V

Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Ductility-definition-ductility relationships-Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams and columns in RC buildings during earthquakes-Vulnerability of open ground storey and short columns during earthquakes

TEXT BOOKS:

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

REFERENCE BOOKS

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons
2. Masonry and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros
3. Earthquake –Resistant Design of Masonry Building –Miha Tomazevic, Imperial College Press.
4. Advanced Reinforced Concrete Design – P. C Varghese. Prentice Hall of India Pvt. Ltd.
5. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murty

REFERENCE CODES:

1. IS: 1893 (Part-1) -2002. —Criteria for Earthquake Resistant – Design of structures. B.I.S., New Delhi.
2. IS: 4326-1993, — Earthquake Resistant Design and Construction of Building, Code of Practice B.I.S., New Delhi.
3. IS: 13920-1993, — Ductile detailing of concrete structures subjected to seismic force – Guidelines, B.I.S., New Delhi.

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(A57007) WASTE MANAGEMENT SYSTEM (ELECTIVE-II)

Course Objectives:

- To estimate the design origin of liquid waste from various industries
- To know the quality requirement of various industries
- To know the waste disposal methods and requirement of treatment plants

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the quality of water required for various industries.
- Know the various methods involved in disposing of liquid wastes.
- Know the manufacturing process and design origin of liquid wastes.

UNIT – I

Quality requirements of boiler and cooling waters – Quality requirements of process water for Textiles – Food processing and Brewery Industries – Boiler and Cooling water treatment methods. Basic Theories of Industrial Waste water Management – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems.

UNIT – II

Industrial waste water discharges into streams. Lakes and oceans and problems. Recirculation of Industrial Wastes – Use of Municipal Waste Water in Industries. Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.

UNIT - III

Manufacturing Process and design origin of liquid waste from Fertilizers, Distillers, and Dairy, Special Characteristics, Effects and treatment methods.

UNIT - IV

Manufacturing Process and design origin of liquid waste from Sugar Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

UNIT – V

Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.

TEXT BOOK:

1. Waste Water Treatment by M.N. Rao and Dutta, Oxford & IBH, New Delhi.

REFERENCES:

1. Liquid waste of Industry by Newmerow.
2. Water and Waste Water technology by Mark J. Hammer and Mark J. Hammer (Jr).

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(A57007) WATERSHED MANAGEMENT SYSTEM (ELECTIVE –II)

Course Objectives:

- To provide the concept and characteristics of watershed management system
- To know the principles and measures to control the soil erosion
- To know the cropping management system

Programme Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the need of watershed development in India
- Know the controlling techniques of soil erosion
- Plan the watershed management activities and preparation of action plan

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, physiographic, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-II

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-III

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

LAND MANAGEMENT: Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

UNIT-IV

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.

UNIT-V

Planning of watershed management activities, people's participation, preparation of action plan, administrative requirements.

TEXT BOOKS:

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

REFERENCE:

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

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(A57201)TRANSPORTATION ENGINEERING LAB

Course Objectives:

- To impart the knowledge on road aggregates, bitumen and bitumen mixes
- To provide the knowledge of methods of tests conducted on various road materials.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the limiting properties of various road materials used in pavement design.
- Have the knowledge of consultancy potential.

LIST OF EXPERIMENTS

I. TESTS ON ROAD AGGREGATES

1. Aggregate crushing value
2. Aggregate impact value
3. Specific gravity and water absorption
4. Los Angeles abrasion test
5. Shape tests: (a) Elongation index, (b) Flakiness index
6. Devil's Attrition Test
7. Shape Test

II. TESTS ON BITUMEN

1. Penetration tests
2. Softening point tests
3. Ductility tests
4. Fire and Flash point
5. Bitumen extraction tests

Note: Minimum of 10 experiments are to be conducted from the above list.

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(A57202)ENVIRONMENTAL ENGINEERING LAB

Objectives:

To know **Course**

- The various lab tests involve in knowing the properties of water and sewage
- To provide the knowledge of methods of conducting the lab test

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Know the standard limits of water and sewage.
- Have the knowledge of consultancy potential of water and sewage test.

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.

Note: Minimum of 10 experiments are to be conducted from the above list.

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(A58001) GROUND IMPROVEMENT TECHNIQUES

Course Objectives:

- To know the techniques involved in improving the load bearing capacity of various soils
- To identify basic deficiencies of various soil deposits
- To know the problems of expansive soils and application of geosynthetics.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the ground improvement techniques such as dewatering, insitu densification, soil stabilization to improve the load bearing capacity of soils
- Methods involving the improvement of expansive soils and utilization of geosynthetics

UNIT – I

Dewatering: methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-osmosis. Grouting: Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT – II

In – situ densification methods in granular Soils:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth. In – situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – III

Stabilisation: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum Reinforced Earth: Principles – Components of reinforced earth – factors governing design of reinforced earth walls –design principles of reinforced earth walls.

UNIT – IV

Geosynthetic: Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

UNIT - V

Expansive soils: Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

TEXT BOOKS:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi

REFERENCES:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.
2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, USA

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(A58002) ADVANCED STRUCTURAL DESIGN (ELECTIVE –III)

Course Objectives:

- To understand theory and design principles of special type of RC structures
- To understand the theory and design of steel bridges.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Analyse and design of retaining walls, RC water tanks and bridges
- Design a long span trussed girder steel bridges
- Design a simple steel water tanks.

UNIT – I

Design of Retaining walls, cantilever and counter fort

UNIT – II

Design of RCC water tanks: Circular and rectangular types. (Underground, on ground & overhead), design principles of Intz tanks, introduction to design of steel water tanks.

UNIT – III

Design of silos and bunkers, design concept of chimneys

UNIT – IV

Introduction to concrete bridges, IRC loading, design of slab bridges and T - beam bridges.

UNIT – V

Design of plate girder, design of gantry girder and design of steel trussed bridges for railway loading.

TEXT BOOKS:

1. Reinforced concrete structures by A. K. Jain
2. Advanced Reinforced concrete structures by Varghese, Pranties Hall of India Pvt. Ltd.
3. Design of steel structures by Ramchandra
4. Design of steel structures by N. Subramanyam
5. Design of steel structures by Arya and Azmani

Codes: Relevant IS: codes.

REFERENCES:

1. Reinforced concrete design by S.U,Pillai and D.Menon, Tata Mc.Ghrawhill Publishing company
2. Advanced Reinforced Concrete Design by P.C. Varghese, Prentice Hall India.
3. Design drawing of concrete and steel structures by N.Krishna Raju University Press.
4. Reinforced concrete structures Vol-2 by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt. Ltd., New Delhi

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(A58003) REHABILITATION AND RETROFITTING OF STRUCTURES (ELECTIVE – III)

Course Objectives:

- To understand the maintenance and repair strategies required for concrete, steel, timber and masonry structures.
- To understand the advanced technologies available in repairing of structures
- To know the seismic retrofitting of structures

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the behavior of existing constructions.
- Understand the main causes of structural failures and will be able to give the guidelines to their repairs and retrofitting.
- Give the guidelines and retrofitting procedures required for seismic prone structures

UNIT-I: MAINTENANCE AND REPAIR STRATEGIES

Maintenance, Facets of Maintenance, importance of Maintenance, various aspects of Inspection, Condition Assessment of a structure, Various methods of Condition assessment , NDT and NDE ,Repair Strategies , Repairs-Rehabilitation-Retrofitting-Strengthening-Upgradation of a Structure, Selection of Materials and Techniques for Repair

UNIT-II: REPAIRS TO MASONRY AND CONCRETE STRUCTURES

Methods of crack repair in masonry and concrete structures, routing and sealing of cracks, removal and surface preparation in masonry and concrete structures, cleaning of reinforcement steel, reinforcement repair, anchorage, bonding repair materials to existing concrete, material placement methods; Shot-creting and guniting, Grouting- Portland cement grouting, chemical grouting, Dry packing, polymer impregnation, Strengthening of structures: Techniques, design consideration, flexural strengthening, Shear Strengthening, strengthening of columns- jacketing of Columns, strengthening by interior and external reinforcing, External Pre-stressing, Fiber wrapping, Corrosion Protection: surface treatment, joint sealants, cathodic protection, removal and replacement techniques of Structural members.

UNIT-III: REPAIRS TO TIMBER AND STEEL STRUCTURES

Testing of Timber Structures for rots , marine borers , Creosote retention , micro biological activity and moisture content –Planning for repairs in Timber Structures-Repairs to Timber Structures Testing of structural steel, lamination, Dynamic Loading and Fatigue, welding technology, weldability, Cleaning and surface Preparation of Corroded Structural Steel, replacement and addition of new members,different Types of Steel and Composite Joints.

UNIT IV - REPAIRS TO SPECIAL STRUCTURES AND SPECIAL REPAIRING TECHNIQUES

Repairs to Concrete Structures under water , Repairs to Bridges , Repairs to Water Tanks , Repairs to Tunnels , Repairs to Dams – At least one case study for each of these structures – Strengthening using FRP -Strengthening and stabilization techniques for repair, engineered demolition techniques for structures – Implosion - case studies.

UNIT V - SEISMIC RETROFITTING OF STRUCTURES

Condition Assessment of Buildings - Repair and Retrofit of Non-engineered Buildings - Retrofit of Masonry Buildings - Retrofit of Historical and Heritage Structures - Structural Analysis for Seismic Retrofit - Retrofit of Reinforced Concrete Buildings - Retrofit of Steel Buildings - Mitigation of Geotechnical Seismic Hazards - Retrofit of Foundations - Retrofit using Fibre Reinforced Polymer Composites - Base Isolation and Energy Dissipation - Quality Assurance and Control - Retrofit Case Studies

TEXT BOOKS:

1. Den Campbell, Allen and Harold Roper, "Concrete Structures Materials, Maintenance and Repair", Longman Scientific and Technical, UK, 1991.
2. Allen R.T and Edwards S.C, "Repair of Concrete Structures", Blakie and Sons, UK, 1987
3. Philip H. Perkins "Repair , Protection and Waterproofing of Concrete Structures", Elsevier Applied Science Publisher, London, Newyark, 1986
4. P.C. Guha " Maintenance and Repairs of Buildings " , New Central Book Agency , Kolkata 2006

REFERENCES:

1. H.W.Kwon " Maintenance and Repair of Concrete under water" , 11th International Conference Proceedings , Conclinic Co. Ltd., 2013
2. CPWD " Handbook on Repair and Rehabilitation of RC buildings " , Director General of CPWD , New Delhi, 2002
3. IITM & CPWD " Hand book on Seismic Retrofit of buildings " , Narosa Publishing House
4. American Wood Council " National Design Specification " , 2005

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(A58004) DESIGN AND DRAWING OF IRRIGATION STRUCTURES (ELECTIVE –III)

Course Objectives:

- To provide the knowledge of purpose and functions of irrigation structures
- To impart the knowledge of design and drawing various irrigation structures

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Know the theories involved in the analysis and design of various irrigation structures
- Provide the all relevant drawings related canal irrigation

Design and drawing of the following hydraulic structures are to be taught.

Group A

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

Group B

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

Final Examination pattern:

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

The duration of examination will be FOUR hours.

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

TEXT BOOKS:

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

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(A58005) PRESTRESSED CONCRETE (ELECTIVE –IV)

Course Objectives:

- To impart the knowledge of systems of pre-stress concrete and their disadvantages
- Know the analysis of pre and post tensioning simple structures
- Design the flexural members for shear, bond and torsion and design the end blocks.
- Analysis and design of composite section and their application in design of prestressed concrete bridges.

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the advantages of pre-stressed concrete structural elements over the conventional elements
- Analysis and design of simple pre-stressed concrete structures

UNIT-I

1. Definition, classification and systems of pre stress ship, properties of materials in PSC,
Loss of prestress, losses of prestress in pretension and post tensioned members

Unit-II

1. Cable profile, Kern points, load balancing concept, Analysis f simple sections and stress diagrams for prestress, dead and live loads., Analysis of composite section and stress diagrams for prestress, dead and live loads

UNIT-III

1. Simply supported and continuous beams. Concordant cable profile, Design of sections,
Flexural strength of rectangular I and T sections using IS code provisions

UNIT-IV

1. Design of shear, shear failure, web shear failure, flexural shear failure, shear compression failure , shear tension failure. Shear strength of beams of uncracked and cracked in flexure

UNIT-IV

Deflections of PSC members fro simply supported beams with point loads UDLs.
Analysis and Design of End Block by Guyor's method for not more than two cables.

TEXT BOOKS:

1. Prestressed Concrete by Krishna Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCE:

1. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.

Codes: BIS code on prestressed concrete, IS 1343.

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(A58006) PAVEMENT ANALYSIS AND DESIGN (ELECTIVE –IV)

Course Objectives:

- To provide the knowledge on various types of pavements used in construction with computation of material characteristics and layer concepts
- To provide knowledge on stresses induced in pavements and its importance
- To explain various types of pavement designs like flexible and rigid
- To provide the knowledge on highway construction and maintenance of different pavements

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand the types of pavements and the materials used effectively in the pavements
- Gives an idea to explore various highway construction materials, techniques and their maintenance
- Design the various pavements by using the available sources economically
- Have the knowledge on identification of causes pavement failures and remedial measures

UNIT – I

Types of pavement – Factors affecting design of pavements – wheel loads –ESWL Concept- tyre pressure – contact pressure, Material characteristics – Environmental and other factors. Stresses in flexible pavement – layered systems concept – one layer system – Boussinesq Two layer system – Burmister Theory for Pavement Design.

UNIT – II

Stresses in rigid pavements – relative stiffness of slab, modulus of sub-grade reaction – stresses due to warping, stresses due to loads, stresses due to friction. Pavement design: CBR Method of Flexible Pavement Design- IRC method of flexible pavement design.- AASHO Method of Flexible Pavement design

UNIT – III

IRC method of Rigid pavement design – Importance of Joints in Rigid Pavements- Types of Joints – Use of Tie Bars and Dowell Bars. Highway Materials – Soil, Aggregate and Bitumen- Tests on aggregates – Aggregate Properties and their Importance- Tests on Bitumen – Bituminous Concrete- Requirements of Design Mix- Marshall's Method of Bituminous Mix design.

UNIT – IV

Highway construction – Construction of Earth Roads- Gravel Roads – WBM Roads- Bituminous Pavements- Cement Concrete Roads- Steps in Construction- Reinforced Concrete Pavements – Soil Stabilization – Methods and Objectives- Soil-cement Stabilization and Soil-lime Stabilization.

UNIT – V

Need for Highway Maintenance- Pavement Failures- Failures in Flexible Pavements- Types and Causes-Rigid Pavement Failures- Types and causes- Pavement Evaluation- Benkelman Beam method- Strengthening of Existing Pavements- Overlays.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.J.Justo, Nemchand & Bros., 7th Edition (2000).
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali & Dr.N.B.Lal – Khanna publishers – (2003).
3. Design of functional pavement Nai C Yang – Mc Graw Hill Publications

REFERENCES:

1. Principles of pavement design – Yoder & wit zorac – Jhonwilley & Sons.

CODES:

1. IRC Code for flexible pavement – IRC – 37 -2001.
2. IRC Code for Rigid pavement – IRC – 58 – 2002

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IV Year B.Tech. CIVIL – II Sem

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(A58007)AIR POLLUTION AND CONTROL (ELECTIVE –IV)

Course Objectives:

- To learn the source of air pollution and its effects on humankind
- To learn the meteorology and plume dispersion
- To design and operation of air pollution equipment

Course Outcomes:

On successful completion of this course, it is expected that the students will be able to,

- Understand in general terms, the major issues and challenges facing and air transportation in the 21st century.
- Properties of atmosphere and its influence on the control of air pollution
- Manage the air quality in atmosphere for better living

UNIT – I

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution- stationary and mobile sources.

UNIT – II

Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc. Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like SO_x, NO_x, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.

UNIT – III

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 behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-IV

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – V

General Methods of Control of NO₂ and SO₂ emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

Air Quality Management – Monitoring of SPM, SO₂; NO and CO Emission Standards.

TEXT BOOKS:

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

REFERENCE:

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

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(A58201) SEMINAR

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(A58202) COMPREHENSIVE VIVA-VOCE

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(A58203)PROJECT WORK

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