

B.Tech. (R19) UCEV (Autonomous) w.e.f 2019-20

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 Civil Engg.

DEPARTMENT OF CIVIL ENGINEERING
 UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
 VIZIANAGARAM – 535003, ANDHRA PRADESH, INDIA

B.Tech. COURSE STRUCTURE (2019-admitted batch)

I. B.TECH I SEMESTER

S.NO	Code	COURSE TITLE	POs	L	T	P	C
1	HS	Communicative English		3			3
2	BS	Calculus		3			3
3	BS	Engineering Chemistry		3			3
4	ES	Problem Solving and programming using C		3			3
5	ES	Engineering Graphics and Drafting		1		3	2.5
LABS							
6	HS	English Communication Skills Lab - I				3	1.5
7	BS	Engineering Chemistry Lab				3	1.5
8	ES	Mechanical Workshop Practice				3	1.5
9	ES	Problem Solving and programming using C -Lab				3	1.5
Mandatory Courses							
10	MC	Constitution of India		3			0
11	MC	Physical Fitness Activities/Yoga		2			0
Total Credits							20.5

BOS MEMBERS:

1. Dr. Ch. Srinivasa Rao
2. Dr. G.V.R. Prasada Raju
3. Dr. M. Swaroopa Rani
4. Dr. G.V.R. Srinivasa Rao
5. Dr. A. Dalu Naidu
6. Dr. Giridhar Rajesh B
7. Mr. P. Murali Krishna
8. Mr. T. Konjala Rao

- *C. Srinivasa Rao*
 -
 - *M. Swaroopa Rani*
 - *G.V.R. Srinivasa Rao*
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 - *T. Konjala Rao*



APPENDIX-E1

B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF BS&HS
UNIVERSITY COLLEGE OF ENGINEERING VIZAINAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
VIZAINAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year I Semester

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Communicative English
(Common to all Branches)

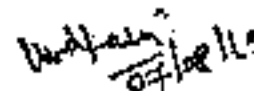
Introduction:

The course is designed to train students in receptive (listening and reading) as well as productive and interactive (speaking and writing) skills by incorporating a comprehensive, coherent and integrated approach that improves the learners' ability to effectively use English language in academic/ workplace contexts. The shift is from *learning about the language* to *using the language*. On successful completion of the compulsory English language course/s in B.Tech., learners would be confident of appearing for international language qualification/proficiency tests such as IELTS, TOEFL, or BEC, besides being able to express themselves clearly in speech and competently handle the writing tasks and verbal ability component of campus placement tests. Activity based teaching-learning methods would be adopted to ensure that learners would engage in actual use of language both in the classroom and laboratory sessions.

Course Objectives:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing


Dr. S. Kalichitra Valli


Dr. K. Mathavi Reddy

Unit I:

Lesson-1: A Drawer full of happiness from "Infotech English", Marathi Publications

Lesson-2: Deliverance by Frenchand from "The Individual Society", Pearson Publications. (Non-detailed)

Listening: Listening to short audio texts and identifying the topic. Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions both in speaking and writing.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introductions and introducing others.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Paragraph writing (specific topics) using suitable cohesive devices: linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) (Antonyms and Synonyms, Word applications) Verbal reasoning and sequencing of words.

Grammar: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural basic sentence structures, simple question form - wh-questions; word order in sentences.

Pronunciation: Vowels, Consonants, Plural markers and their realizations

Unit II:

Lesson-1: Nehru's letter to his daughter Indira on her birthday from "Infotech English", Marathi Publications

Lesson-2: Bosom Friend by Hira Baxsedra from "The Individual Society", Pearson Publications (Non-detailed)

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks. Functional English: Greetings and leave taking.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Reading for Writing: Summarizing - identifying main ideas and rephrasing what is read; avoiding redundancies and repetitions.


Dr. S. Kalesha Vali


Dr. K. Muthavi Reddy

- **Vocabulary:** Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) (Antonyms and Synonyms, Word application)
- **Grammar:** Use of articles and zero article; prepositions.
- **Pronunciation:** Past tense markers, word stress-di-syllabic words

Unit III:

Lesson-1: Stephen Hawking-Positivity 'Benchmark' from "Infotech English", Maruthi Publications

Lesson-2: Slinkerspearo's Sister by Virginia Woolf from "The Individual Society", Pearson Publications. (Non-detailed)

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.

Functional English: Complaining and Apologizing.

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main ideas and rephrasing what is read; avoiding redundancies and repetitions. Letter writing-types; format and principles of letter writing. E-mail etiquette; Writing CV's.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Association, sequencing of words

Grammar: Verbs - tense; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

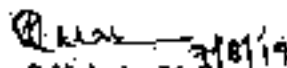
Pronunciation: word stress-poly-syllabic words

Unit IV:

Lesson-1: Liking a Tree, Unbowed: Wangari Maathai-biography from "Infotech English", Maruthi Publications

Lesson-2: Telephone Conversation-Wole Soyinka from "The Individual Society", Pearson Publications. (Non-detailed)

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio); listening to audio-visual texts.


Dr. S. Kalasha Valli


Dr. K. Madhavi Reddy

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: Permissions, Requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Writing SOP, writing for media.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Cloze Encounters

Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Pronunciation: Contrastive Stress

Unit V:

Lesson-1: Stay Hungry-Stay foolish from "Indutech English", Marathi Publications

Lesson-2: Still I Rise by Maya Angelou from "The Individual Society", Pearson Publications. (Not-detailed)

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides. Functional English: Suggesting/Opinion giving.

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques.

Reading for Writing: Writing academic proposals- writing research articles: format and style.

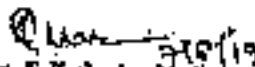
Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Coherence, matching emotions.

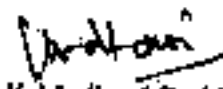
Grammar: Editing short texts - identifying and correcting common errors in grammar and usage. (articles, prepositions, tenses, subject verb agreement)

Pronunciation: Stress in compound words

Course Outcomes:

At the end of the module, the learners will be able to


Dr. S. Kalasha Valli


Dr. K. Madhavi Reddy

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic and pieces of specific information
- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

Prescribed text books:

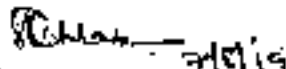
1. "Infotech English", Maruthi Publications. (Detailed)
2. "The Individual Society", Pearson Publications. (Non-detailed)


Prescribed text book for Laboratory for Semesters-I & II:

1. "Infotech English", Maruthi Publications. (with Compact Disc)

Reference Books

- Bailey, Stephen. *Academic Writing. A handbook for international students*. Routledge, 2014.
- Chase, Becky Taylor. *Pathways: Listening, Speaking and Critical Thinking*. Heinley E.L.T. 2nd Edition, 2018.
- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Education.
- Hewings, Martin. *Cambridge Academic English (B1)*. CUP, 2012.


Dr. S.Kalasha Valli


Dr.K.Madhavi Reddy



APPENDIX – A1

B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA

VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year I Semester

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Calculus

(Common to ALL branches)

Course Objectives:

- This course will illuminate the students in the concepts of calculus.
- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

UNIT I: Sequences, Series and Mean value theorems

(10 hrs)

Sequences and Series: Convergence and divergence – Ratio test – Comparison tests – Integral test – Cauchy's root test – Alternate series – Leibnitz's rule.

Mean Value Theorems (without proofs): Rolle's Theorem – Lagrange's mean value theorem – Cauchy's mean value theorem – Taylor's and Maclaurin's theorems with remainders.

UNIT II: Differential equations

(15 hrs)

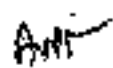
Linear differential equations – Bernoulli's equations – Exact equations and equations reducible to exact form – Non-homogeneous equations of higher order with constant coefficients with non-homogeneous term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x^n , $e^{ax} V(x)$ and $x^n V(x)$ – Method of Variation of parameters

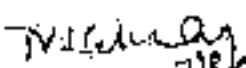
Applications: Orthogonal trajectories – Electrical circuits (RL, RC, RLC) – Simple Harmonic motion.

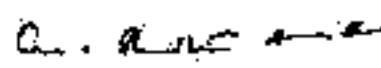
UNIT III: Partial differentiation:

(10 hrs)


1. Dr. Shankar Kalash Vell


2. Dr. A.V. Papa Rao


Dr. T.V.S. Sekhar


Dr. Ch. Santhi Sundaraju

Introduction – Homogeneous function – Euler's theorem – Total derivative – Chain rule – Jacobian – Functional dependence – Taylor's and Maclaurin's series expansion of functions of two variables.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

UNIT IV: Multiple Integrals

(8 hrs)

Double and Triple Integrals – Change of order of integration – Change of variables.

Applications: Finding Areas and Volumes.

UNIT V: Special Functions

(8 hrs)

Introduction to Improper Integrals – Beta and Gamma functions – Properties – Relation between Beta and Gamma functions – Evaluation of Improper Integrals.

Course Outcomes:

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

- utilize mean value theorems to real life problems
- solve the differential equations related to various engineering fields
- familiarize with functions of several variables which is useful in optimization
- Apply double integration techniques in evaluating areas bounded by region
- students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
- Conclude the use of special function in multiple integrals

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.

Reference Books:

1. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc Graw Hill Education.
2. Joel Hass, Christopher Hall and Maurice D. Weir, Thomas calculus, 14th Edition, Pearson.
3. Lawrence Tiryin, Advanced Engineering Mathematics, CRC Press, 2013.
4. Srikantha Pal, S C Bhunia, Engineering Mathematics, Oxford University Press.

1. Dr. Shank Kalasha Valli

2. Dr. A V Papa Rao

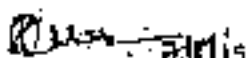
Dr. T.V.S. Sekhar

Dr. Ch. Santosh Sundarajit

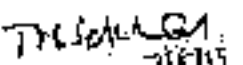
3. Discrete Mathematics and its Applications with Combinatorics and Graph Theory. K. H. Rosen, 7th Edition, Tata McGraw Hill.


Reference Books:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T. P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures, Gerard Kolman, Robert C. Busby, Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S. K. Chakrabarti and B.K. Sarker, Oxford, 2011


1. Dr. Shrik Kalesha Veli


2. Dr. A.V. Purna Rao


Dr. T.V.S. Sekhar


Dr. Ch. Santhi Sundaraju



APPENDIX-C2

B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF BS&HSS

UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)

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VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year I Semester

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ENGINEERING CHEMISTRY

(For Non-circular branches CE, ME & MET)

Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources.

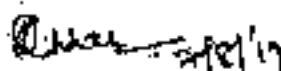
Course Objectives:

- *Importance* of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- *Outline* the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- *Express* the increase in demand as wide variety of advanced materials are introduced, which have excellent engineering properties.
Classify and discuss the materials used in major industries like steel industry, metallurgical industries and construction industries and electrical equipment manufacturing industries. Lubrication is also summarized.
- *Relate* the need of fuels as a source of energy to any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence introduced.
- *Explain* the importance and usage of water as basic material in almost all the industries; *interpret* drawbacks of steam boilers and also how portable water is supplied for drinking purposes.

UNIT II: POLYMER TECHNOLOGY

Polymerisation:- Introduction-methods of polymerization (emulsion and suspension)-physical and mechanical properties.

Plastics: Compounding-fabrication (compression, injection, blown film, extrusion) - preparation.


Dr. S. Kalasha Vani


Dr. S. Satyaved

properties and applications of PVC, polycarbonates and Bakelite-mention some examples of plastic materials used in electronic gadgets, recycling of e-plastic waste.

Elastomers: Natural rubber-drawhicks-vulcanization-preparation, properties and applications of synthetic rubbers (Buna S, thiokol and polyurethanes);

Composite materials: Fiber reinforced plastics-conducting polymers-biodegradable polymers-biopolymers-biomedical polymers.

UNIT II: ELECTROCHEMICAL CELLS AND CORROSION

Single electrode potential-Electrochemical series and uses of series-standard hydrogen electrode, calomel electrode-concentration cell-construction of glass electrode-Batteries: Dry cell, Ni-Cd cells, Ni-Metal hydride cells, Li ion battery, zinc air cells-Fuel cells: H_2-O_2 , CH_3OH-O_2 , phosphoric acid, molten carbonate.

Corrosion: Definition-theories of corrosion (chemical and electrochemical)-galvanic corrosion, differential aeration corrosion, stress corrosion, wastline corrosion-passivity of metals-galvanic series-factors influencing rate of corrosion-corrosion control (proper designing, cathodic protection)-Protective coatings: Surface preparation, cathodic and anodic coatings, electroplating, electroless plating (nickel), Paints (constituents, functions, special paints).

UNIT III: CHEMISTRY OF MATERIALS

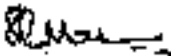
Nano materials: Introduction-sol-gel method-characterization by BET, SEM and TEM methods-applications of graphene-carbon nanotubes and fullerenes: Types, preparation and applications

Thermal analysis techniques: Instrumentation and applications of thermogravimetric analysis (TGA), differential thermal analysis (DTA), differential scanning calorimetry (DSC).

Refractories: - Definition, classification, properties (refractoriness, refractoriness under load, porosity and thermal spalling), failure of refractories.

Lubricants: - Definition, mechanism of lubricants and properties (definition and importance).

Cement: - Constituents, manufacturing, parameters to characterize the clinker formation: lime saturation factor (LSF), silica ratio (SR) and alumina ratio (AR), chemistry of setting and hardening, deterioration of cement.


Dr. S. Kalash Valli


Dr. S. Srinivasan

UNIT IV: FUELS.

Introduction-colorific value-HCV and LCV-problems using Dulong's formula-proximate and ultimate analysis of coal sample-significance of these analyses-problems-Petroleum (refining-cracking)-Synthetic petrol (Fischer Tropach and Bergius)-petrol knocking-diesel knocking-octane and cetane ratings-and-knock agents-Introduction to alternative fuels. (Bio-diesel, ethanol, methanol; Natural gas, LPG, CNG)-Flue gas analysis by Orsat apparatus-Rocket fuels.

UNIT V: WATER TECHNOLOGY

Hardness of water-determination of hardness by complexometric method-boiler troubles (priming and foaming, scale formation, boiler corrosion, caustic embrittlement)-internal treatments-softening of hard water (zeolite process and related units, ion exchange process)-treatment of industrial waste water Potable water and its specifications-steps involved in purification of water-chlorination, break point chlorination-reverse osmosis and electro dialysis.

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

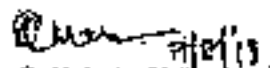
- *Outline* preparation, properties and applications of some plastic materials and synthetic rubber explain the mechanism of conduction in conducting polymers.
- *Explains* the theory of construction of battery, fuel cells and categorize the reasons for corrosion and study some methods of corrosion control.
- *Outline* the awareness of materials like nanomaterials, fullerenes, refractories and lubricants.
- *Differentiate* petroleum, petrol, synthetic petrol, study alternate fuels and flue gases.
- *Explains* the impurities present in raw water, problems associated with them and how to avoid them are understood.

Text Books;

1. Engineering Chemistry by Jain and Jain; Dhansraj Rai Publishing Co. Latest edition
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2019 edition.

Reference Books;

1. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
2. Engineering Chemistry by Shashi Chawla; Dhansraj Rai Publishing Co. Latest edition


Dr. S. Kalasha Vell


Dr. S. Sathyan

Problem Solving and Programming Using C

Course Objectives:

- To impart adequate knowledge on the need of programming languages and problem solving techniques and develop programming skills.
- To enable effective usage of Control Structures and implement different operations on arrays.
- To Demonstrate the use of Strings and Functions.
- To impart the knowledge of pointers and understand the principles of dynamic memory allocation.
- To understand structures and unions and illustrate the file concepts and its operations.
- To impart the Knowledge Searching and Sorting Techniques.

Syllabus:

UNIT-I

Introduction to Computer Problem Solving: Programs and Algorithms, Computer Problem Solving Requirements, Phases of Problem Solving, Problem Solving Strategies; Top-Down Approach, Algorithm Designing, Program Verification, Improving Efficiency, Algorithm Analysis and Notations.

UNIT-II

Introduction to C Programming: Introduction, Structure of a C Program, Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/output Statements, Operations, Type Conversion, Control Flow, Relational Expressions; Conditional Branching Statements: if, if-else, if-else-if, switch, Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, goto-statement.

UNIT-III

Arrays: Introduction, Operations on Arrays, Arrays as Function Arguments, Two dimensional Arrays, Multi dimensional arrays.

Pointers: Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function Arguments, Pointers and Arrays, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command Line Arguments.

UNIT-IV

Functions: Introduction, Function Declaration, Function Definition, Function Call, Categories of Functions, Passing Parameters to Functions, Scope of Variables, Variable Storage Classes, Recursion.

Strings: String Fundamentals, String Processing with and without Library Functions, Pointers and

Members- Board of Studies

A.T.N
Chairman- Board of Studies

I B. Tech - II Semester:

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Problem Solving and Programming Using C

UNIT-V

Structures, Unions, Bit Fields: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type –enum variables, Using typedef keyword, Bit Fields.

Data Files: Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

Course Outcomes:

At the end of the Course, Student will be able to:

- Illustrate the fundamental concepts of Computers and basics of computer programming.
- Use Control Structures and Arrays in solving complex problems.
- Develop modular program aspects and Strings fundamentals.
- Demonstrate the ideas of pointers usage.
- Solve real world problems using the concept of Structures, Unions and File operations.

Text Books:

1. How to solve it by Computer, R. G. Dromey, and Pearson Education.
2. Computer Programming, Reema Tharaja, Oxford University Press.

Reference Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. Programming in C A-Practical Approach, Ajay Mittal, Pearson.
3. C Programming – A Problem Solving Approach, Forouzan, Gilberg, Cengage.
4. The C Programming Language, Dennis Ritchie And Brian Kernighan, Pearson Education.
5. Programming in C, Ashok Kamthane, Second Edition, Pearson Publication.
6. Let us C , Yaswanth Kanekar, 16th Edition, BPB Publication.

Web Links:

1. <http://www.c4tamp.com/>
2. <http://www.geeksforgeeks.org/c/>
3. <http://nptel.ac.in/courses/122104019/>
4. <http://www.learn-c.org/>
5. <https://www.tutorialspoint.com/cprogramming/>

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A. S. *[Signature]*
Chairman-BOS

ENGINEERING GRAPHICS & DRAFTING

Course Objective: Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, shading etc.

Unit I

Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. Curves. **Polygons:** Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents & normals for the curves.

Scales: Plain scales, diagonal scales and vernier scales

Unit II

Objective: To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces.

Unit III






Objective: The objective is to make the students draw the projections of the plane objects/ inclined to both the reference planes.

Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

Unit IV

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Projections of Solids - Prisms, Pyramids, Cones and Cylinders with the axis inclined to both the planes.

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| 1)  (Dr. C. Neelima Devi) | 2)  (Dr. N. Mohan Rao) | 3)  (Sri. V. Mani Kumar) |
| 4)  (Dr. A. Gopala Krishna) | 5) ABSENT
(Dr. V. Pandu Ranga) | 6) ABSENT
(Dr. N. V. Swamy Naidu) |
| 7)  (Dr. L. S. V. Prasad) | 8) ABSENT
(Dr. V. Rama Krishna) | 9) ABSENT
(Mr. Ch. Dilleeswar Rao) |

Unit V

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Computer Aided Drafting, Creating 2D&3D drawings of objects using relevant software.

Note: In the End Examination there will be no question from CAD.

TEXT BOOKS:

1. Engineering Drawing by N.D. Bhatt, Charlot Publications
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

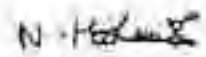
REFERENCE BOOKS:


1. Engineering Drawing by K.L. Narayana & P. Kanniah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by P.I. Varghese, McGrawHill Publishers
4. Engineering Drawing + AutoCad - K Venugopal, V. Prabhu Raja, New Age

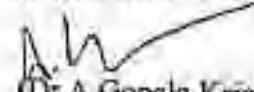
Course Outcome:

- CO1. To make the students to draw the attributes and its importance in the fields of design and manufacturing
- CO2. To make the student familiar with the techniques used for drawing various geometric elements used in engineering practice.
- CO3. Making them to understand orthographic projections of points, lines, planes and solids in various positions with respect to different reference planes.
- CO4. Ability to use the concepts of isometric projections to analyze 3D objects by viewing their 2D projections and vice versa.

1) 
(Dr. C. Neelima Devi)


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7) 
(Dr. E. S. V. Prasad)

8) ABSENT
(Dr. V. Rama Krishna)

9) ABSENT
(Mr. Ch. Dilleswara Rao)

ANNEXURE-II

B.Tech (R19) UCEV (Autonomous) n.a.f.2019-21



DEPARTMENT OF BS&ISS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
VIZIANAGARAM - 535 903, ANDHRA PRADESH, INDIA

B.Tech I Year I Semester

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English Communication Skills Lab
(Common to all Branches)

UNIT I:

Pronunciation: Vowels, Consonants

Oral Activity: JAM

UNIT II:

Pronunciation: Consonants

Oral Activity: Past tense markers

UNIT III:

Pronunciation: Word Stress

Oral Activity: Hypothetical Situations

UNIT IV:

Pronunciation: Diphthongic words, polysyllabic words

Oral Activity: Self/Peer profile

UNIT V: Common Errors in Pronunciation

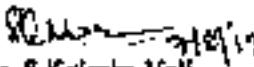
Neutralizing Accent


Prescribed text book: Phonetics Transcription

1. "Infotech English", Marathi Publications.

Reference Books:

1. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
2. English Pronunciation in use- Mark Hancock, Cambridge University Press.
3. English Phonetics and Phonology-Peter Roach, Cambridge University Press.
4. English Pronunciation in use- Mark Hewings, Cambridge University Press.
5. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
6. English Phonetics for Indian Students- P. Bal Subramanian, Mac Millan Publications.


Dr. S. Kalishan Valli


Dr. K. Madhavi Reddy

DEPARTMENT OF BS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NERU TECHNOLOGICAL UNIVERSITY, KAKINADA
VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year I Semester

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ENGINEERING CHEMISTRY LAB

(For Non-electrical branches CE, ME & MET)

Introduction to Chemistry laboratory → Molarity, normality, primary, secondary standard solutions, volumetric titrations, quantitative analysis


1. Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of Mn (II) using standard oxalic acid solution.
4. Determination of ferrous iron using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
5. Determination of copper (II) using standard hypo solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of iron (III) by a colorimetric method.
8. Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).
9. Determination of the concentration of strong acid vs strong base (by conductometric method).
10. Determination of strong acid vs strong base (by potentiometric method).
11. Determination of Mg^{+2} present in an antacid.
12. Determination of CaCO_3 present in an egg shell.
13. Estimation of Vitamin C.
14. Determination of % moisture and % volatile matter in coal sample by proximate analysis.
15. Preparation of biodiesel.
16. Preparation of nylon-6, 6 and Bakelite (demonstration only).

Of the above experiments at-least 10 assessment experiments should be completed in a semester.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

Reference Books

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.


Dr. S. Kalesha Vall


Dr. S. Satyavani

MECHANICAL WORKSHOP PRACTICE

Course Objective: To impart hands-on practice on basic engineering trades and skills.

Note: At least two exercises to be done from each trade.

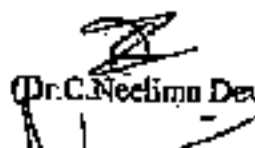
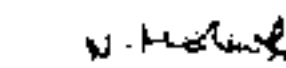

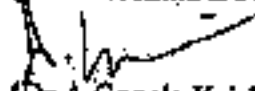

Trade:

- | | |
|------------------------|--|
| 1. Carpentry | 1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint |
| 2. Fitting | 1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit |
| 3. Black Smithy | 1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt |
| 4. House Wiring | 1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance |
| 5. Tin Smithy | 1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel |
| 6. IT Workshop | 1. Assembly & Disassembly of Computer |

CO1. Able to understand the basic engineering trades

CO2. Able to analyze working of various tools

CO3. Able to understand the basic hardware of computer

- | | | |
|---|--|--|
| 1) 
(Dr. C. Neelima Devi) | 2) 
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(Sri. V. Mani Kumar) |
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| 7) 
(Dr. L. S. V. Prasad) | 8) ABSENT
(Dr. V. Rama Krishna) | 9) ABSENT
(Mr. Ch. Dilleswara Rao) |

Problem Solving and Programming Using C Lab**Course Objectives:**

- To impart knowledge on basic Linux commands, various Editors, Raptor.
- To make the students understand the concepts of C programming.
- To nurture the students on Control Structures and develop different operations on arrays.
- To make use of String fundamentals and modular programming constructs.
- To implement programs using dynamic memory allocation.
- To explain the concepts of Structure, Unions and files for solving various problems.

List of Experiments:**1. Introduction to Algorithms and Flowcharts**

- 1.1) Implement Algorithm Development for Exchange the values of Two numbers.
- 1.2) Given a set of n student's examination marks (in the range 0-100) make a count of the number of students that passed the examination. A Pass is awarded for all of 50 and above.
- 1.3) Given a set of n numbers design an algorithm that adds these numbers and returns the resultant sum. Assume N is greater than or equal to zero.

2. Introduction to C Programming

- 2.1) Basic Linux Commands.
- 2.2) Exposure to Turbo C, Vi, Emacs, Code Blocks IDE, Dev C++.
- 2.3) Writing simple programs using printf(), scanf() .

3. Raptor

- 3.1) Installation and Introduction to Raptor.
- 3.2) Draw a flow chart to find the Sum of 2 numbers.
- 3.3) Draw a flow chart to find Simple interest.

4. Basic Math

- 4.1) Write a C Program to convert Celsius to Fahrenheit and vice versa.
- 4.2) Write a C Program to find largest of three numbers using ternary operator.
- 4.3) Write a C Program to Calculate area of a Triangle using Heron's formula.

5. Control Flow- I

- 5.1) Write a C Program to Find Whether the Given Year is a Leap Year or not.
- 5.2) Write a C program to find the roots of a Quadratic Equation.
- 5.3) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using Switch, case.

Problem Solving and Programming Using C Lab**6. Control Flow- II**

- 6.1) Write a C Program to Find Whether the Given Number is Prime number or not.
- 6.2) Write a C Program to Find Whether the Given Number is Armstrong Number or not.
- 6.3) Write a C program to print Floyd Triangle.

7. Control Flow- III

- 7.1) Write a C program to find the sum of individual digits of a positive integer.
- 7.2) Write a C program to check whether given number is palindromic or not.
- 7.3) Write a C program to read two numbers, x and n , and then compute the sum of the geometric progression $1+x+x^2+x^3+\dots+x^n$.

8. Arrays

- 8.1) Write a C program to search an element in the given array (Linear Search).
- 8.2) Write a C program to perform matrix addition.
- 8.3) Write a C program to perform matrix multiplication.

9. Pointers

- 9.1) Write a C Program to Perform Addition, Subtraction, Multiplication and Division of two numbers using Command line arguments.
- 9.2) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using `malloc ()` function.
- 9.3) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using `calloc ()` function.

10. Functions, Array & Pointers

- 10.1) Write a C Program to demonstrate parameter passing in Functions.
- 10.2) Write a C Program to find Fibonacci, Factorial of a number with Recursion and without recursion.
- 10.3) Write a C Program to find the sum of given numbers with arrays and pointers.

11. Strings

11.1) Implementation of string manipulation operations with library function:

- a) copy
- b) concatenate
- c) length
- d) compare

11.2) Implementation of string manipulation operations without library function:

- a) copy
- b) concatenate
- c) length
- d) compare

11.3) Write a C program to check whether the given string is a palindrome or not.

Chairman- Board of Studies

Problem Solving and Programming Using C Lab

12. Structures

- 12.1) Write a C Program to Store Information of a book Using Structure.
 12.2) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function.

13. Files

- 13.1) Write a C program to open a file and to print the contents of the file on screen.
 13.2) Write a C program to copy content of one file to another file.
 13.3) Write a C program to merge two files and store content in another file.

14. Application

Creating structures to capture the student's details save them in file in proper record format, search and prints the student details requested by the user

Note: Draw the flowcharts using Raptor from Experiment 3 to Experiment 6.

Course Outcomes:

- Implement basic programs in C and design flowcharts in Raptor.
- Use Conditional and Iterative statements to solve real time scenarios in C.
- Implement the concept of Arrays and Modularity and Strings.
- Apply the Dynamic Memory Allocation functions using pointers.
- Develop programs using structures, and Files.

Reference Books:

1. Let Us C Yashwanth Kannekar, 16th edition, BPB Publications.
2. Programming in C: A Practical Approach Ajay Mittal, Pearson Education.
3. The C programming Language, Dennis Ritchie and Brian Kernighan, Pearson Education.
4. Problem solving using C, K. Venugopal, 3rd Edition, TMG Publication.

Web Links:

1. <https://www.hackerrank.com/>
2. <https://www.geogebra.org/m/>
3. <https://www.tutorialspoint.com/>
4. <https://code-cracker.github.io/>
5. <https://raptor.martincorrie.com/>
6. <https://nptel.ac.in/course/106112508/5/2>

Members- Board of Studies:

A. J. R.
 Chairman- Board of Studies



APPENDIX-D4

U.T.O (R19) UCEV (Autonomous) No.1 2019-20

DEPARTMENT OF BS&HS
UNIVERSITY COLLEGE OF ENGINEERING VIZAINAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
VIZAINAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year I or II Semester

L T P C
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Constitution of India
(Common to All Branches)

Course Objectives:

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
- To understand the central and state relation financial and administrative.

UNIT-I

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

UNIT-II

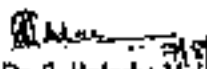
Union Government and its Administration Structure of the Indian Union: Federalism, Centre: State relationship; President: Role, powers and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;


UNIT-III

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

UNIT-IV

Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation Panchayati Raj; Functions PR: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level


Dr. S. Kalpana Devi


Dr. P. Srinivas


Dr. V. Krishna Mohan

Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissioners, State Election Commission, Functions of Commissions for the welfare of SC/ST/OBC and women

Course Outcomes:


At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
 1. Know the sources, features and principles of Indian Constitution.
 2. Learn about Union Government, State government and its administration.
 3. Get acquainted with Local administration and Panchayat Raj.
 4. Be aware of basic concepts and developments of Human Rights.
 5. Gain knowledge on roles and functioning of Election Commission

Reference Books:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice - Hall of India Pvt. Ltd., New Delhi.
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. B.C. Gupta, Indian Government and Politics


Dr. S. Kalpana Vah


Dr. P. S. K. Vign


Dr. V. Krishna Mohan

5. H.M. Seervai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. L. Raj, Indian Government and Politics
8. M.V. Pyke, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice - Hall of India Pvt. Ltd., New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Rights, Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

E-resources:

1. nptel.ac.in/courses/109/104074/8
2. nptel.ac.in/courses/109/104045/
3. nptel.ac.in/courses/101/104065/
4. www.lawlib.ac.in/en/lecture-details
5. www.litb.ac.in/en/e-ym/2nd-lecture-institute-lecture-series-indian-constitution


Dr. S. Kalesha Valli


Dr. P. K. Reddy


Dr. V. Krishna Mohan

B.Tech. (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM - 535003, ANDHRA PRADESH, INDIA

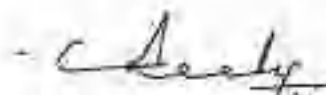
B.Tech. COURSE STRUCTURE (2019 admitted batch)

I. B.TECH II SEMESTER

S.NO	Code	COURSE TITLE	POs	L	T	P	C
1	BS	Linear Algebra and Numerical methods		3			3
2	BS	Engineering Physics		3			3
3	ES	Engineering Mechanics		3			3
4	ES	Basic Electrical & Electronics Engineering		3			3
5	ES	Computer Aided Engineering Drawing		3			2.5
LABS							
6	HS	English Communication Skills Lab - II				3	1.5
7	BS	Engineering Physics lab				3	1.5
8	BS	Engineering Physics Virtual Lab				2	0
9	ES	Basic Electrical & Electronics Engineering Lab				3	1.5
10	ES	Engineering Exploration Project Design Thinking (15 Hrs Per Semester)					0.5
Mandatory Courses							
11	MC	Professional Ethics & Human Values		3			0
Total Credits							19.5

BOS MEMBERS:

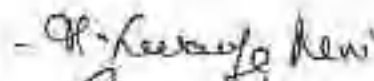
1. Dr. Ch. Srinivasa Rao

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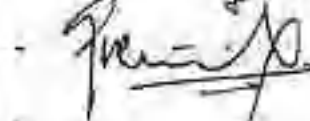
2. Dr. G.V.R. Prasada Raju

-

3. Dr. M. Swaroopa Rani

- 

4. Dr. G.V.R. Srinivasa Rao

- 

5. Dr. A. Dali Naidu

-

6. Dr. Giridhar Rajesh B

-

7. Mr. P. Murali Krishna

-

8. Mr. T. Kondala Rao

- 



DEPARTMENT OF BS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous),
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year II Semester

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Linear algebra and Numerical Methods
(Common to ALL branches)

Course Objectives:

- To instruct the concept of Matrices in solving linear algebraic equations.
- To elucidate the different numerical methods to solve nonlinear algebraic equations.
- To disseminate the use of different numerical techniques for carrying out numerical integration.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

Unit I: Solving systems of linear equations, Eigen values and Eigen vectors: (10 hrs)

Rank of a matrix by echelon form and normal form- Gauss Jordan method to find inverse – Solving system of homogeneous and non-homogeneous equations linear equations — Eigen values and Eigen vectors and their properties.

Applications: Free vibration of a two-mass system.

Unit-II: Cayley-Hamilton theorem and Quadratic forms: (10 hrs)

Cayley-Hamilton theorem (without proof) – Finding inverse and power of a matrix by Cayley-Hamilton theorem – Reduction to Diagonal form – Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation.

UNIT III: Iterative methods: (8 hrs)

Introduction – Algebraic transcendental equations: Bisection method – Secant method – Method of false position – Iteration method – Newton-Raphson method (One variable and simultaneous Equations)

Solving system of linear equations: Gauss elimination- Diagonal dominance- Jacobi and Gauss-Seidel methods- Necessary and sufficient condition for convergence(only statement)-Power Method for finding Largest Eigenvalue –Eigenvector.

1. Dr. Shaik Kalesha Vall

2. Dr. A V Purna Rao

Dr. T.V.S. Sekhar

Dr. Ch. Santhigundarraju

UNIT IV: Interpolation:

(10 hrs)

Introduction - Errors in polynomial interpolation - Finite differences - Forward differences - Backward differences - Central differences - Relations between operators - Newton's forward and backward formulae for interpolation - Interpolation with unequal intervals - Lagrange's interpolation formula - Newton's divide difference formula.

UNIT V: Numerical Integration and solution of ordinary differential equations: (10 hrs)

Trapezoidal rule - Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule - Solution of ordinary differential equations by Taylor's series - Picard's method of successive approximations - Euler's method - Runge-Kutta method (second and fourth order) - Milne's Predictor and Corrector Method.

Course Outcomes:

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

- develop the use of matrix algebra techniques that is needed by engineers for practical applications
- solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel
- evaluate approximating the roots of polynomial and transcendental equations by different algorithms
- apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals
- apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations


Text Books:

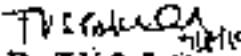
1. M. K. Jain, S. R. K. Iyengar and R. K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publications.
2. B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.

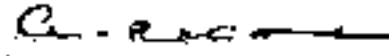
Reference Books:

1. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.
2. David Poole, Linear Algebra: A modern Introduction, 4th Edition, Ceonage.
3. Steven C. Chapra, Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education.
4. Lawrence Tiryu, Advanced Engineering Mathematics, CRC Press.


1. Dr. Shrik Kalasha Wali


2. Dr. A.V. Papa Rao


Dr. T.V.S. Sekhar


Dr. Ch. Santhi Sundaraja



B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF BS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year II Semester
ENGINEERING PHYSICS
For Non-Circuitel Branches (CE, ME & MET)

L T P C
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The designed curriculum introduces the fundamentals of elasticity, sensors, and mechanics of solids to CE, ME and MET students so as to acquaint them with the behavior of materials and develop a basic understanding of the advanced courses in their respective branches.

Course Objectives:

- To demonstrate the use of Newton's laws of motion for understanding the mechanics of a particle.
- Tap the simple harmonic motion and its adaptability for improved acoustic quality of concert halls-impart concepts of flaw detection techniques using ultrasonics.
- Study the structure-property relationship exhibited by solid materials within the elastic limit. Impart knowledge basic concepts of lasers and fibre optics along with its engineering applications
- Familiarize types of sensors for various engineering applications.
- To impart knowledge concerning the electrical behaviour of dielectric materials.
- To demonstrate the properties of magnets.

UNIT-I: Mechanics


(10hrs)

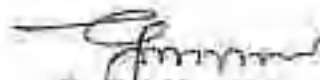
Basic Laws of Vectors and Scalars - Rotational Frames - Conservative and Non-Conservative Forces - $F = -\text{grad } V$ - Newton's Laws in Inertial and Linear Accelerating Non-Inertial Frames of Reference - Rotating Frame of Reference with Constant Angular Velocity - Harmonic Oscillator - Damped Harmonic Motion - Forced Oscillations and Resonance - Quality Factor - Mechanical and Electrical Oscillators.


UNIT-II: Acoustics and Ultrasonics

(9hrs)

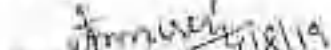
Acoustics: Reverberation - Reverberation Time - Sabine's Formula (Derivation using Growth and Decay Method) - Absorption Coefficient and its Determination - Factors Affecting Acoustics of Buildings and their Remedies.


Dr. S. Kalesha Vali


Dr. G. J. Nagesh Raju


Dr. G. Padmaja Rani


Dr. Y. Ramu Krishna


Dr. J. Krishna Murthy

Ultrasonics: Production of Ultrasonics by Magnetostriction and Piezoelectric Methods - Acoustic Grating - Non-Destructive Testing - Pulse Echo System through Transmission and Reflection Modes - Applications.

UNIT-III: Elasticity and Sensors

(10hrs)

Elasticity: Stress - Strain - Hooke's Law - Stress - Strain Curve - Generalized Hooke's Law with and without Thermal Strains for Isotropic Materials - Different Types of Moduli and their Relations - Bending of Beams - Bending Moment of a Beam - Depression of Cantilever.

Sensors (Qualitative Description Only): Different Types of Sensors and Applications - Strain and Pressure Sensors - Piezoelectric, Magnetostrictive Sensors - Temperature Sensor - Bimetallic Strip - Fibre Optic Methods of Pressure Sensing - Pyroelectric Detectors.

UNIT-IV: Lasers and Fiber Optics

(9hrs)

Lasers: Characteristics - Spontaneous and Stimulated Emission of Radiation - Einstein's Coefficients - Population Inversion - Pumping Mechanisms - Ruby Laser - Helium Neon Laser - Applications.

Fibre Optics: Total Internal Reflection - Acceptance Angle - Numerical Aperture - Classification of Fibers Based on Refractive Index Profile and Modes - Block Diagram of Fiber Optic Communication.

UNIT-V: Magnetic and Dielectric Materials

(10 hrs)

Magnetic Materials: Introduction - Magnetic Dipole Moment - Magnetization - Magnetic Susceptibility and Permeability - Origin of Permanent Magnetic Moment - Classification of Magnetic Materials - Domain Concept of Ferromagnetism - Hysteresis - Soft and Hard Magnetic Materials - Energy storage applications.

Dielectric Materials: Introduction - Dielectric Polarization - Dielectric Polarizability - Susceptibility and Dielectric Constant - Electronic and Ionic Polarizations (Quantitative) - Orientation Polarization (Qualitative) - Lorentz Field - Clausius - Mossotti Equation - Frequency Dependence of polarization.


Dr. S. Kalesha Valli


Dr. G. Naga Raju


Dr. G. Padmaja Rani


Dr. Y. Rama Krishna


Dr. J. Krishna Murthy

Course Outcomes:

The students will be able to

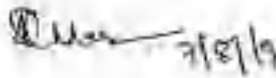
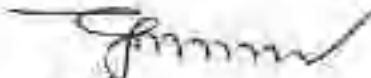
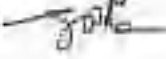
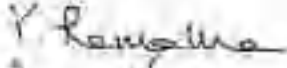
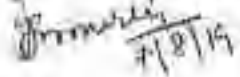
- describe the fundamental principles of acoustics with emphasis on physical mechanisms, law and relationships
- assess harmonic motion in undamped, damped and forced oscillations
- apply the concepts of strain, internal force, stress and equilibrium to deformation of solids
- understand the interaction of radiation with matter
- explain the principles of physics in dielectrics, magnetic materials and semiconductors useful to engineering applications
- illustrate the fibre optic methods of pressure sensing and infer the functioning of temperature sensors like bimetallic strip and pyroelectric detectors
- outline the basic principle and operation of different types of sensors

Text books:

1. M.N. Avadhanulu, P.G. Kshirsagar "A Text book of Engineering Physics", 11th ed., S. Chand Publications, 2019
2. S.O. Pillai, Solid State Physics 8th ed., New Age International, 2018

Reference Books:

1. D. Kleppner and Robert Kolenkow "An introduction to Mechanics- II" Cambridge University Press, 2015
2. A Textbook of Engineering Physics, Volume-I. (For 1st Year of Anna University) By M.N. Avadhanulu &
3. T.V.S. Arun Murthy S Chand
4. Ian R Sinclair, Sensor and Transducers 3rd edn. 2001, Elsevier (Newnes)

1. Dr. S.Kalesha Vall	Chairman	
2. Dr. G.J. Naga Raja	Internal Member	
3. Dr. G. Padmaja Rani	External Member	
4. Dr. Y. Rama Krishna	External Member	
5. Dr. J. Krishna Murthy	External Member	

ENGINEERING MECHANICS

Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

UNIT - I

Objectives: The students are to be exposed to the concepts of force and friction, direction and its application.

Introduction to Engg. Mechanics - Basic Concepts.

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

Friction: Introduction, limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction

UNIT II

Objectives: The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.

Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorem, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the law of polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses.

UNIT - III



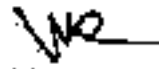
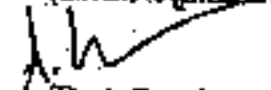

Objectives : The students are to be exposed to concepts of centre of gravity. The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.

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

Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, Pappus theorems.

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

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

- | | | |
|--|---|---|
| 1)  (Dr. C. Neelima Devi) | 2)  (Dr. N. Mohan Rao) | 3)  (Sri. V. Mani Kumar) |
| 4)  (Dr. A. Gopala Krishna) | 5) ABSENT
(Dr. V. Pandu Ranga) | 6) ABSENT
(Dr. N. V. Swamy Naidu) |
| 7)  (Dr. L. S. V. Prasad) | 8) ABSENT
(Dr. V. Rama Krishna) | 9) ABSENT
(Mr. Ch. Dilleswara Rao) |

UNIT - IV

Objectives: The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion. Rectilinear and Curvilinear motion of a particle Kinematics and Kinetics- D'Alembert's Principle, Work Energy method and applications to particle motion- Impulse momentum method.

UNIT - V

Objectives: The students are to be exposed to rigid motion kinematics and kinetics Rigid body Motion: Kinematics and kinetics of translation, Rotation about fixed axis and plane motion, Work Energy method and Impulse momentum method.

TEXT BOOK:






1. Engg. Mechanics - S.Timoshenko & D.H.Young, 4th Edn -, Mc-Graw Hill publications.

REFERENCES:



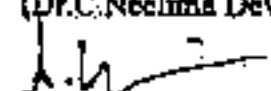

1. Engineering Mechanics statics and dynamics- R.C.Hibbeler, 11th Edn - Pearson Publ.
2. Engineering Mechanics , statics - J.L.Meriam, 6th Edn - Wiley India Pvt Ltd.
3. Engineering Mechanics , dynamics- J.L.Meriam, 6th Edn - Wiley India Pvt Ltd.
4. Engineering Mechanics , statics and dynamics - L.H.Shames, - Pearson Publ.
5. Mechanics For Engineers , statics - F.P.Beer & E.R.Johnston - 5th Edn Mc Graw Hill Publ.
6. Mechanics For Engineers, dynamics - F.P.Beer & E.R.Johnston - 5th Edn Mc Graw Hill Publ.
7. Theory & Problems of engineering mechanics, statics & dynamics - E.W.Nelson, C.L.Best & W.G. McLean, 5th Edn - Schaum's outline series - Mc Graw Hill Publ.
8. Engineering Mechanics , Ferdinand L. Singer , Harper - Collins.
9. Engineering Mechanics statics and dynamics , A Nelson , Mc Graw Hill publications
10. Engineering Mechanics, Taya. Umesh Publ.

Course outcomes:

- CO1. To Learn the principles (Axioms) of statics, able to find resultant & resolution of system of forces and resultant force.
- CO2. Explore the concepts of constraints, free body diagram and action-reaction.
- CO3. Estimate the geometric parameters like centroid, center of gravity and moment of inertia and identify their application.

1)  (Dr. C. Neelima Devi)	2)  (Dr. N. Mohan Rao)	3)  (Sri. V. Mani Kumar)
4)  (Dr. A. Gopala Krishna)	5) ABSENT (Dr. V. Pandu Ranga)	6) ABSENT (Dr. N. V. Swamy Naidu)
7)  (Dr. L. S. V. Prasad)	8) ABSENT (Dr. V. Rama Krishna)	9) ABSENT (Mr. Ch. Dilleswara Rao)

- CO4. Learn the analysis of frames and trusses and know the importance of friction.
CO5. Able to determine solution to dynamic problems through D'Alembert equilibrium equations, Impulse-Momentum and work-energy method.

- | | | |
|---|---|--|
| 1) 
(Dr. C. Neelima Devi) | 2) N. Mohan Rao
(Dr. N. Mohan Rao) | 3) 
(Sri. V. Mani Kumar) |
| 4) 
(Dr. A. Gopala Krishna) | 5) ABSENT
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(Dr. L. S. V. Prasad) | 8) ABSENT
(Dr. V. Rama Krishna) | 9) ABSENT
(Mr. Ch. Dileswara Rao) |



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (AUTONOMOUS)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I Year: II Semester

Basic Electrical And Electronics Engineering
(Common for CIVIL, MEC, MET Engg.)

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Preamble:

This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines and electronic components to perform well in their respective fields.

Course objectives:

- To learn the basic principles of electrical circuit laws and analysis of networks.
- To understand principle of operation and construction details of DC machines & Transformers.
- To understand principle of operation and construction details of alternator and 3-Phase induction motor.
- To study operation of PN junction diode, half wave, full wave rectifiers and OP-AMPS.
- To learn operation of PNP and NPN transistors and various amplifiers.

Unit - I

Electrical Circuits

Basic definitions - types of network elements - Ohm's Law - Kirchhoff's Laws - inductive networks - capacitive networks - series - parallel circuits - star-delta and delta-star transformations-Numerical Problems.

Unit - II

DC Machines

Principle of operation of DC generator - EMF equation - types of DC machines - torque equation - applications - three point starter - speed control methods of DC motor - Swinburne's Test-Numerical Problems.

Unit - III

AC Machines:

Transformers

Principle of operation and construction of single phase transformers - EMF equation - Losses - OC & SC tests - efficiency and regulation-Numerical Problems.

AC Rotating Machines

Principle of operation and construction of alternators - types of alternators - Regulation of alternator by synchronous impedance method- principle of operation of synchronous motor - principle of operation of 3-Phase induction motor - slip-torque characteristics - efficiency - applications-Numerical Problems.

Unit IV

Rectifiers and Linear ICs and Transistors

PN junction diodes - diode applications (half wave and bridge rectifiers). Characteristics of operation amplifiers (OP-AMP) - application of OP-AMPS (inverting, non-inverting, Integrator and differentiator) -

Unit V

Transistors

PNP and NPN junction transistor, transistor as an amplifier – transistor amplifier – frequency response of CE amplifier – concepts of feedback amplifier.

Course Outcomes:

The student should be able to:

- Analyse various electrical networks.
- Understand operation of DC generators, 3-point starter and DC machine testing by Swinburne's Test.
- Analyse performance of single-phase transformer.
- Explain operation of 3-phase alternator and 3-phase induction motors.
- Analyse operation of half wave, full wave bridge rectifiers and OP-AMPs and Explain single stage CE amplifier and concept of feedback amplifier.

Text Books:

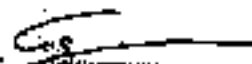
1. Electrical Technology by Suminder Pal Bali, Pearson Publications.
2. Electronic Devices and Circuits by R.L. Boylestad and Louis-Nasbielsky, 9th edition, PHI 2006.

Reference Books:

1. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor & Francis Group
2. Basic Electrical Engineering by M.S. Naidu and S. Kamakshiah, TMH Publications.
3. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition
4. Basic Electrical Engineering by Nagarkar, Sukhija, Oxford Publications, 2nd edition
5. Industrial Electronics by G.K. Mittal, PHI.

1. 

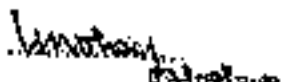
(Smt. A. Padmaja)

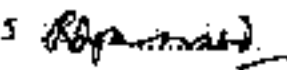
2. 

(Prof. G. Saraswathi)

3. 

(Dr. V.S. Vaikunth)

4. 
(Sri. S.V.R. Krishna Mohan)

5. 
(Dr. D. Ramaprasad)

2019-2020

UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (AUTONOMOUS)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
B.TECH (MECHANICAL ENGINEERING)
EFFECTIVE FROM 2019-20 BATCH

I Year B.Tech. – II Sem.

COMPUTER AIDED ENGINEERING DRAWING

Course Objective: To enhance the student's knowledge and skills in engineering drawing and to introduce drafting packages and commands for computer aided drawing and modeling.

UNIT-I:

Objectives: The knowledge of projections of solids is essential in 3D modeling and animation. The student will be able to draw projections of solids. The objective is to enhance the skills they already acquired in their earlier course in drawing of projection.

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT-II:

The knowledge of sections of solids and development of surfaces is required in designing and manufacturing of the objects. Whenever two or more solids combine, a definite curve is seen at their intersection.

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

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid, Cone and their parts.

UNIT-III:

The intersection of solids also plays an important role in designing and manufacturing. The objective is to impart this knowledge through this topic. A perspective view provides a realistic 3D View of an object. The objective is to make the students learn the methods of Iso and Perspective views.

INTERPENETRATION OF RIGHT REGULAR SOLIDS: Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone, Prism Vs Cone.

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

In part B computer aided drafting is introduced.

UNIT IV:


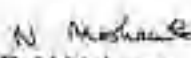
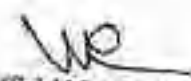
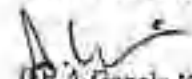

The objective is to introduce various commands in AutoCAD to draw the geometric entities and to create 2D and 3D wire frame models.

INTRODUCTION TO COMPUTER AIDED DRAFTING: Generation of points, lines, curves, polygons, dimensioning. Types of modeling : object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling.

UNIT V:

By going through this topic the student will be able to understand the paper-space environment thoroughly.

VIEW POINTS AND VIEW PORTS: view point coordinates and view(s) displayed, examples to exercise different options like save, restore, delete, joint, single option.

- | | | |
|---|--|--|
| 1) 
(Dr. C. Neelima Devi) | 2) 
(Dr. N. Mohan Rao) | 3) 
(Sri. V. Mani Kumar) |
| 4) 
(Dr. A. Gopala Krishna) | 5) ABSENT
(Dr. V. Pandu Ranga) | 6) ABSENT
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| 7) 
(Dr. L. S. V. Prasad) | 8) ABSENT
(Dr. V. Rama Krishna) | 9) ABSENT
(Mr. Ch. Dilleswara Rao) |

2019-2020

UNIVERSITY COLLEGE OF ENGINEERING VEZIANAGARAM (AUTONOMOUS)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
UITECH (MECHANICAL ENGINEERING)
EFFECTIVE FROM 2019-20 BATCH

UNIT VI:

The objective is to make the students create geometrical model of simple solids and machine parts and display the same as an Isometric, Orthographic or Perspective projection.

COMPUTER AIDED SOLID MODELING: Isometric projections, orthographic projections of isometric projections, Modeling of simple solids, Modeling of Machines & Machine Parts.

TEXT BOOKS:

1. Engineering drawing by N.D Bhatt, Charotar publications.
2. Engineering Graphics, R.C. John, PHI Publications

REFERENCES:

1. Mastering Auto CAD 2013 and Auto CAD LT 2013 - George Ortuzi, Sybex
2. Auto CAD 2013 fundamentals- Elliswasa, SDC Publ.
3. Engineering Drawing and Graphics using Auto Cad - T Jayapovita, vikas
4. Engineering Drawing + AutoCAD - K Venugopal, V. Prabhu Raja, New Age
5. Engineering Drawing - RK Dhawan, S Chand
6. Engineering Drawing - MB Shaw, BC Rama, Pearson
7. Engineering Drawing - KL Nayyana, P Kunjalak, Scltech
8. Engineering Drawing - Agarwal and Agarwal, Mc Graw Hill
9. Engineering Graphics - P Varghese, Mc Graw Hill
10. Text book of Engineering Drawing with auto-CAD, K.venkata reddy/B.S. publications.
11. Engineering Drawing with Auto CAD/ James D Bethune/Pearson Publications
12. Engineering Graphics with Auto CAD/Kulkarni D.M, Rautog/ A.P, Sarkar A.K/PHI Publications

End Semester examination shall be conducted for Four hours with the following pattern:

- a) Two hour- Conventional drawing
- b) Two hours - Computer Aided Drawing.

Course outcomes:


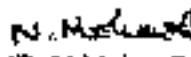

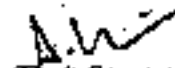

From this course the student is expected to learn

CO1: The concepts of sections and developments of solids

CO2: The formation of layers during intersection of different types of regular solids.

CO3: Basics in AUTO CAD

CO4: To draw the 2D and 3D objects using AUTO CAD

1)  (Dr. E. Neelima Devi)	2)  (Dr. N. Mohan Rao)	3)  (Sri. V. Mani Kumar)
4)  (Dr. A. Gopala Krishna)	5) ABSENT (Dr. V. Pandu Ranga)	6) ABSENT (Dr. N. V. Swamy Naidu)
7)  (Dr. L. S. V. Prasad)	8) ABSENT (Dr. V. Rama Krishna)	9) ABSENT (Mr. Ch. Dilleswara Rao)



APPENDIX-E3

B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF BSS168

UNIVERSITY COLLEGE (OF ENGINEERING VIZAINAGARAM (Autonomous)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA

VIZAINAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year II Semester

L T P C
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Advanced Communication Skills Lab
(Common to all Branches)

UNIT I:

Pronunciation: Contrastive stress (Homograph)

Oral Activity: Telephone Etiquette

UNIT II:

Pronunciation: Word stress – Weak and Strong forms

Oral Activity: Role plays

UNIT III:

Pronunciation: Phonetics Transcription Oral Activity: Data Interpretation, Oral presentation skills

Oral Activity: Oral presentation Skills

UNIT IV:

Pronunciation: Connected speech (Pausing, Tempo, Tone, Fluency etc..)

Oral Activity: Public Speaking, Poster Presentation

UNIT V:

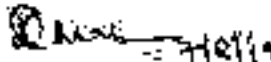
Pronunciation: Stress in compound words, Rhythm and Intonation

Oral Activity: Group discussions: Do's and Don'ts –Types, Modalities

Interview Skills: Preparatory Techniques: Frequently asked questions, Mock Interviews,

References:

1. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
2. English Pronunciation in use- Mark Hancock, Cambridge University Press.
3. English Phonetics and Phonology- Peter Roach, Cambridge University Press.
4. English Pronunciation in use- Mark Hewings, Cambridge University Press.
5. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
6. English Phonetics for Indian Students- P. Bala Subramaniam, Mac Millan Publications.
7. Technical Communication- Meenakshi Ramani, Sangeeta Sharma, Oxford University Press.
8. Technical Communication- Rajendra Singh Chauhan, Smita Kashimanka, Cengage Publications.


Dr. S. Kalash Valli


Dr. K. Madhavi Reddy



DEPARTMENT OF BS&HS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech I Year II Semester

ENGINEERING PHYSICS LAB

(Any 10 of the following listed 15 experiments)

L T P C
0 0 3 1.5

LIST OF EXPERIMENTS:

1. V-I Characteristics of a PN junction diode
2. Rigidity modulus of a material - Torsional Pendulum
3. LCR- series resonance circuit
4. Young's modulus of the given material bar by uniform bending - Pin and Microscope method
5. Sonometer
6. Wavelength of Laser by diffraction grating
7. V-I Characteristics of a Zener junction diode.
8. Magnetic field along the axis of a current carrying coil - Stewart and Gee's apparatus
9. Dielectric Constant of different materials.
10. RC circuit - time constant
11. Acceleration due to Gravity and Radius of Gyration - Compound Pendulum.
12. B-H curve
13. Magnetic susceptibility by Quincke's method
14. Velocity of ultrasonics - Acoustic Grating
15. Pressure variation with strain- strain Gauge sensor

- | | |
|--------------------------|-----------------|
| 1. Dr. S.Kalesha Vali | Chairman |
| 2. Dr. G.J. Naga Raju | Internal Member |
| 3. Dr. G. Padmaja Rani | External Member |
| 4. Dr. Y. Rama Krishna | External Member |
| 5. Dr. J. Krishna Murthy | External Member |

21/8/19
21/8/19

Y. Rama Krishna

21/8/19



B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF BS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
VIZIANAGARAM - 535 803, ANDHRA PRADESH, INDIA

B.Tech I Year II Semester

ENGINEERING PHYSICS VIRTUAL LAB

L T P C
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Virtual Lab Experiments (Engineering Physics)

1. Newton's Second Law of Motion
2. Young's Modulus of The Given Material Bar by Uniform Bending using Pin and Microscope Method
3. Young's Modulus of The Given Material Bar by Non Uniform Bending using Pin and Microscope Method
4. Numerical Aperture and Acceptance Angle - Optical Fiber
5. Beam Divergence and Spot Size of The Given Laser Beam
6. Elastic Constants of a Material Using The Principle of Optical Interference
7. Acoustic Grating
8. Heat Transfer by Natural Convection
9. B-H Curve
10. Compound Pendulum - Symmetric

- | | |
|--------------------------|-----------------|
| 1. Dr. S.Kalesta Vall | Chairman |
| 2. Dr. G.J. Naga Raju | Internal Member |
| 3. Dr. G. Padmaja Rani | External Member |
| 4. Dr. Y. Rama Krishna | External Member |
| 5. Dr. J. Krishna Murthy | External Member |

S.Kalesta Vall
2/8/19

G.J. Naga Raju

G. Padmaja Rani

Y. Rama Krishna

J. Krishna Murthy
2/8/19.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
UNIVERSITY COLLEGE OF ENGINEERING-VIZIANAGARAM (AUTONOMOUS)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

I Year II	BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB	L	T	P	C
Semester	(Common for Civl,MEC,MET Engg.)	0	0	3	1.5

Course objectives:

- To predetermine the efficiency of dc shunt machine using Swinburne's test.
- To predetermine the efficiency and regulation of 1-phase transformer with O.C and S.C tests.
- To obtain performance characteristics of DC shunt motor & 3-phase Induction motor.
- To find out regulation of an alternator with synchronous impedance method.
- To control speed of dc shunt motor using Armature voltage and Field flux control methods.
- To find out the characteristics of PN junction diode & transistor.
- To determine the ripple factor of half wave & full wave rectifiers.

Section A: Electrical Engineering:

The following experiments are required to be conducted as compulsory experiments:

1. Swinburne's test on D.C. Shunt machine (predetermination of efficiency of a given D.C. shunt machine working as motor and generator).
2. OC and SC tests on single phase transformer (predetermination of efficiency and regulation at given power factors).
3. Brake test on 3-phase Induction motor (determination of performance characteristics)
4. Regulation of alternator by Synchronous impedance method.
5. Speed control of D.C. Shunt motor by
 - a) Armature Voltage control b) Field flux control method
6. Brake test on D.C. Shunt Motor.

Section B: Electronics Engineering:

The following experiments are required to be conducted as compulsory experiments:

1. PN junction diode characteristics a) Forward bias b) Reverse bias (Cut in voltage and resistance calculations)
2. Transistor CE characteristics (input and output)
3. Half wave rectifier with and without filters.
4. Full wave rectifier with and without filters.
5. CE amplifiers.
6. OP- amp applications (Inverting, non inverting, integrator and differentiator)

Course Outcomes:

The student should be able to:

- Compute the efficiency of DC shunt machine without actual loading of the machine.
- Estimate the efficiency and regulation at different load conditions and power factors for single phase transformer with OC and SC tests.
- Analyse the performance characteristics and to determine efficiency of DC shunt motor & 3-Phase induction motor.
- Pre-determine the regulation of an alternator by synchronous impedance method.
- Control the speed of dc shunt motor using Armature voltage and Field flux control methods.
- Draw the characteristics of PN junction diode & transistor
- Determine the ripple factor of half wave & full wave rectifiers.

1. 

(Smt. A. Padmaja)

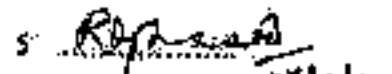
2. 

(Prof. G. Saraswathi)

3. 

(Dr. V.S. Vakula)

4. 
09/09/2019
(Sri. S.V.R. Krishna Mohan)

5. 
07/07/19
(Dr. D. Ramprasad)

APPENDIX-D5

B.Tech (19) UCEV (Vizainagaram) v.2.0 2019-20



DEPARTMENT OF BS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZAINAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZAINAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech (Year I or II Semester)

L T P C
3 0 0 0

Professional Ethics & Human Values.
(Common to All Branches)

Course Objectives:

- To create an awareness on Engineering Ethics and Human Values.
- To fulfill Moral and Social Values and Loyalty
- To appreciate the rights of others.
- To create awareness on assessment of safety and risk

Unit I: Human Values:

Morals, Values and Ethics-Integrity-Work Ethic-Service Learning - Civic Virtue - Respect for others -Living Peacefully -Caring -Sharing -Honesty -Courage-Cooperation-Commitment - Empathy -Self Confidence Character -Spirituality.

Unit II: Engineering Ethics:

Senses of Engineering Ethics-Variety of moral issues -Types of inquiry -Moral dilemmas -Moral autonomy -Kohlberg's theory-Gilligan's theory-Consensus and controversy -Models of professional roles-Theories about right action-Self-interest -Customs and religion -Uses of Ethical theories -Valuing time -Cooperation -Commitment.

Unit III: Engineering as Social Experimentation

Engineering As Social Experimentation -Framing the problem -Determining the facts -Codes of Ethics -Clarifying Concepts -Application Issues -Common Ground -General Principles -Utilitarian thinking respect for persons

UNIT IV: Engineers Responsibility for Safety and Risk:

Safety and risk -Assessment of safety and risk -Risk benefit analysis and reducing risk-Safety and the Engineer-Designing for the safety-Intellectual Property rights (IPR).

UNIT V: Global Issues

Globalization -Cross-culture issues-Environmental Ethics -Computer Ethics-Computers as the instrument of Unethical behavior-Computers as the object of Unethical acts -Autonomous-


Dr. S. Kalpana Vani


Dr. P. Srinivas


Dr. V. Krishna Mohan

Computers-Computer codes of Ethics-Weapons Development-Ethics and Research-Analyzing Ethical Problems in research.

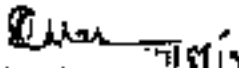
Concrete outcomes:

Students will be able to:

- Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
- Identify the multiple ethical interests at stake in a real-world situation or practice
- Articulate what makes a particular course of action ethically defensible
- Assess their own ethical values and the social context of problems
- Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
- Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
- Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research.

Books:

1. "Engineering Ethics Includes Human Values" by M.Govindarajan, S.Nairajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009
2. "Engineering Ethics" by Harris, Pritchard and Rabino, CENGAGE Learning, India Edition, 2009.
3. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger -Tata McGraw-Hill-2009.
4. "Professional Ethics and Morals" by Prof.A.R.Aryasri, DharamkoraSuyodhama-Maruthi Publications.
5. "Professional Ethics and Human Values" by A.Alavudeen, R.Kaali Rahman and M. Jayakumar-LaxmiPublications.
6. "Professional Ethics and Human Values" by Prof.D.R.Kiran.
7. "Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication


Dr. S. Kalatha Vani


Dr. P. S. Srinivasan


Dr. V. Krishna Mohan

B.Tech. (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM – 535003, ANDHRA PRADESH, INDIA

B.Tech. COURSE STRUCTURE (2019 admitted batch)

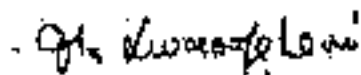
II. B.TECH. I SEMESTER

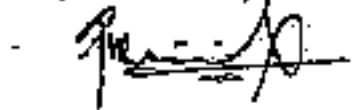
S.NO	Code	COURSE TITLE	POs	L	T	P	C
1	HS	Managerial Economics & Financial Analysis		3			3
2	BS	Vector Calculus, Transforms & PDE		3			3
3	PC	Fluid Mechanics		3			3
4	PC	Surveying & Geomatics		3			3
5	PC	Strength of Materials –I		3			3
6	PC	Building Materials, Planning & construction - Labs		3			3
7	PC	Strength of Materials Lab				3	1.5
8	PC	Surveying Field Work –I				3	1.5
		Mandatory Course					
9	MC	Environmental Science		3			0
						Total Credits	21

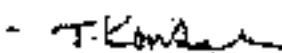
BOS MEMBERS:

1. Dr. Ch. Srinivasa Rao
2. Dr. G.V.R. Prasad Raju
3. Dr. M. Swaroopa Rani
4. Dr. G.V.R. Srinivasa Rao
5. Dr. A. Dali Naidu
6. Dr. Ghidhar Rajesh B
7. Mr. P. Murali Krishna
8. Mr. T. Kondala Rao

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APPENDIX-D1

B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF BS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZAINAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZAINAGARAM - 525 003, ANDHRA PRADESH, INDIA

B.Tech II Year I Semester

L T P C
3 0 0 3

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to all Branches)

Course Objectives:

- The Learning objectives of this paper is to understand the nature and importance of Managerial Economics and its relationship with other disciplines
- To provide conceptual understanding of Demand and Demand forecasting, Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
- To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles
- To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

Unit-I

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics -Scope of Managerial Economics and its relationship with other subjects -Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting, Concept of Supply and Law of Supply.

Unit - II:

Theories of Production and Cost Analysis:

Theories of Production function- Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale- Different cost concepts: opportunity costs, explicit and implicit costs-Fixed costs, Variable


Dr. S. Kulesha Valli


Dr. P. Srinivasulu


Dr. V. Krishna Mohan

Costs and Total costs - Cost - Volume - Profit analysis - Determination of Breakeven point (problems) - Managerial significance and limitations of Breakeven point.

Unit - III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly - Features - Price and Output Determination - Managerial Theories of firm; Marris and Williamson's models - other Methods of Pricing: Business Cycles: Meaning and Features - Phases of a Business Cycle. Features and Evaluation of Sole Trader, Partnership, Joint Stock Company - State/Public Enterprises and their forms.

Unit - IV:

Introduction to Accounting & Financing Analysis:

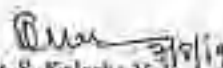
Introduction to Double Entry System, Journal, Ledger, Trial Balance and Preparation of Final Accounts with adjustments - Preparation of Financial Statements - Analysis and Interpretation of Financial Statements - Ratio Analysis - Preparation of Funds flow and cash flow analysis (Problems)

Unit - V:

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital - Capitalization - Meaning of Capital Budgeting - Time value of money - Methods of appraising Project profitability: Traditional Methods (pay back period, accounting rate of return) and modern methods (Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index)

Course Outcomes:

- The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
- The learner understands the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
- The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.


Dr. S. Kalesha Valli


Dr. P. Suresh


Dr. V. Krishna Mohan




TEXT BOOKS:

1. Prof.J.V.Prabhakara Rao & Prof.P.Venkata Rao Maruthi Publications
2. S.A.Siddiqui & A.S.Siddiqui New Age International Publishers

REFERENCES:

1. Varshney R.L, K.L.Maheswari, Managerial Economics, S. Chand & Company Ltd,
2. JI. Pappas and EF Brigham, Managerial Economics, Holt, R & W; New edition edition
3. N.P.Srinivasa and M. SakthivelMurugan, Accounting for Management, S. Chand & Company Ltd,
4. Maheswari S.N, An Introduction to Accountancy, Vikas Publishing House Pvt Ltd
5. J.M.Pandey, Financial Management , Vikas Publishing House Pvt Ltd
6. V. Maheswari, Managerial Economics, S. Chand & Company Ltd


Dr. S. Kalashan Vani


Dr. P. Srinivas


Dr. V. Krishna Mohan





APPENDIX - A3

B.Tech (J119) UCEV (Autonomous) W.O.E 2019-20

DEPARTMENT OF BS&HS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

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

L	T	P	E
3	0	0	3

Vector Calculus, Transforms and PDE

(Common to ECE, EEE of I B.Tech - II Semester & Civil, ME, MET of II B.Tech - I Semester)

Course Objectives:

- To familiarize the techniques in partial differential equations
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

Unit -I: Vector calculus:

(10 hrs)

Vector Differentiation: Gradient - Directional derivative - Divergence - Curl - Scalar Potential.

Vector Integration: Line Integral - Work done - Area - Surface and volume Integrals - Vector integral theorems; Greens, Stokes and Gauss Divergence theorems (without proof).

Unit -II: Laplace Transforms:

(10 hrs)

Laplace transforms of standard functions - Shifting theorems - Transforms of derivatives and integrals - Unit step function - Dirac's delta function - Inverse Laplace transforms - Convolution theorem (with out proof).

Applications: Solving ordinary differential equations (initial value problems) and integro differential equations using Laplace transforms.

Unit -III: Fourier series and Fourier Transforms:

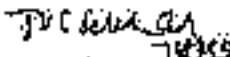
(10 hrs)

Fourier Series: Introduction - Periodic functions - Fourier series of periodic function - Dirichlet's conditions - Even and odd functions - Change of interval - Half-range sine and cosine series.

Fourier Transforms: Fourier integral theorem (without proof) - Fourier sine and cosine integrals - Sine and cosine transforms - Properties - inverse transforms - Finite Fourier transforms.


1. Dr. Shaik Kalesha Vali


2. Dr. A V Papa Rao


Dr. T.V.S. Sekhar


Dr. Ch. Santhi Sundaraju

Unit-IV: PDE of first order:

(8 hrs)

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.

UNIT V: Second order PDE and Applications:

(10 hrs)

Second order PDE: Solutions of linear partial differential equations with constant coefficients – RHS term of the type e^{ax+by} , $\sin(ax+by)$, $\cos(ax+by)$, $x^m y^n$

Applications of PDE: Method of separation of Variables – Solution of One dimensional Wave, Heat and two-dimensional Laplace equation.

Course Outcomes:

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

- Interpret the physical meaning of different operators such as gradient, curl and divergence
- estimate the work done against a field, circulation and flux using vector calculus
- apply the Laplace transform for solving differential equations
- find or compute the Fourier series of periodic signals
- know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
- identify solution methods for partial differential equations that model physical processes

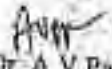
Text Books:

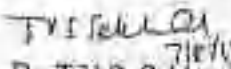
1. B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.

Reference Books:

1. B. V. Ramana, Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.
2. Dean. G. Duffy, Advanced Engineering Mathematics with MATLAB, 3rd Edition, CRC Press.
3. Peter O' Neil, Advanced Engineering Mathematics, Cengage.
4. Srimantha Pal, S C Bhunia, Engineering Mathematics, Oxford University Press.


1. Dr. Shaik Kalesha Vali


2. Dr. A V Papa Rao


Dr. T.V.S. Sekhar


Dr. Ch. Santhi Sundaraju

II Year – I Semester

L	T	P	C
3	0	0	3

FLUID MECHANICS

Course Learning Objectives:

- To understand the properties of fluids and fluid statics
- To derive the equation of conservation of mass and its application
- To solve kinematic problems such as finding particle paths and stream lines
- To use important concepts of continuity equation, Bernoulli's equation and turbulence, and apply the same to problems
- To analyze laminar and turbulent flows
- To understand the various flow measuring devices
- To study in detail about boundary layers theory

Course Outcomes:

Upon successful completion of this course the students will be able to:

- Understand the various properties of fluids and their influence on fluid motion and analyze a variety of problems in fluid statics and dynamics.
- Calculate the forces that act on submerged planes and curves.
- Identify and analyze various types of fluid flows.
- Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.
- Draw simple hydraulic and energy gradient lines.
- Measure the quantities of fluid flowing in pipes, tanks and channels.

Syllabus:

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

UNIT – II Hydrostatics: Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Stability of Floating and submerged bodies.

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak line 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 – Euler's and Bernoulli's equations for flow along a stream line – Momentum equation and its application – forces on pipe bend.

Laminar Flow And Turbulent Flows: Reynold's experiment – Characteristics of Laminar & Turbulent flows, Shear and velocity distributions, Laws of Fluid friction, Hagen-Poiseulle Formula, Flow between parallel plates, Flow through long tubes, hydro dynamically smooth and rough flows.

UNIT – IV Closed Conduit Flow: Darcy-Weisbach equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, variation of friction factor with Reynold's number – Moody's Chart, Pipe network problems, Hazen-Williams formula, Hard-Cross Method,

Measurement of Flow: Pitot tube, Venturi meter and Orifice meter – classification of orifices, small orifice and large orifice, flow over rectangular, triangular, trapezoidal and stepped notches – Broad crested weirs.

UNIT – V Boundary Layer Theory: Boundary layer (BL) – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarman momentum integral equation, laminar and turbulent Boundary layers (no deviations) – BL in transition, separation of BL, Control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

Text Books:

1. Fluid Mechanics, P. N. Modi and S. M. Seth, Standard book house, New Delhi
2. A text of Fluid mechanics and hydraulic machines, R. K. Bansal - Laxmi Publications (P) Ltd., New Delhi

References:

1. Mechanics of Fluids, Merle C. Potter, David C. Wiggert and Bassem H. Ramadan, CENGAGE Learning
2. Fluid Mechanics and Machinery, C.S.P. Ojha, R. Berndtsson and P.N. Chandramouli, Oxford Higher Education.

10/11/20
T. Kandan

C. S. P. Ojha

II Year - I Semester

L T P C

3 0 0 3

SURVEYING AND GEOMATICS

Course Learning Objectives:

To introduce the students to basic principles of surveying, various methods of linear and angles measuring instruments and enable the students to use surveying equipments.

Course Outcomes:

Upon successful completion of the course, the student will be able:

- To demonstrate the basic surveying skills.
- To use various surveying instruments.
- To perform different methods of surveying.
- To compute various data required for various methods of surveying.
- To integrate the knowledge and produce topographical map.

Syllabus:

UNIT – I Introduction: definition-Uses of surveying- overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications – Errors in survey measurements

UNIT – II Distances And Direction: Electronic distance measurements (EDM)- principles of electro optical EDM-Errors and corrections to linear measurements- Compass survey- Meridians, Azimuths and Bearings, declination, computation of angle.

Inversing-Purpose-types of traverse-traverse computation-traverse adjustments-Introduction omitted measurements

UNIT – III Levelling And Contouring: Concept and Terminology, Levelling Instruments and their Temporary and permanent adjustments- method of levelling, Characteristics and Uses of contours- methods of conducting contour surveys.

UNIT – IV Theodolite: Description, principles-uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite – Introduction to Trigonometrical levelling.

Tachometric Surveying: Stadia and tangential methods of Tacheometry, Distance and Elevation formulae for Staff vertical position.

UNIT – V Curves: Types of curves, design and setting out – simple and compound curves-
Introduction to geodetic surveying, Total Station and Global positioning system

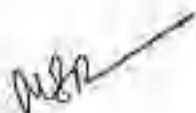
Computation Of Areas And Volumes: Area from field notes, computation of areas along
irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a
level section and two level sections with and without transverse slopes, determination of the
capacity of reservoir, volume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

Text Books:

1. Surveying, Vol No.1, 2 &3, B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications Ltd, New Delhi
2. Advance Surveying, Satish Gopi, R. Sathi Kumar and N. Madhu, Pearson Publications.
3. Text book of Surveying, C. Venkatarumalah, University press, India Limited.
4. Surveying and levelling, R. Subramanian, Oxford University press.


References:

1. Text book of Surveying, S.K. Duggal (Vol No. 1&2), Tata McGraw Hill Publishing Co. Ltd, New Delhi.
2. Text book of Surveying, Arora (Vol No. 1&2), Standard Book House, Delhi.
3. Higher Surveying, A.M. Chandra, New Age International Pvt









STRENGTH OF MATERIALS-I**Course Learning Objectives:**

- To impart preliminary concepts of Strength of Material and Principles of Elasticity and Plasticity Stress-strain behavior of materials and their governing laws. Introduce student the moduli of Elasticity and their relations
- To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.
- To give concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections
- The concepts above will be utilized in measuring deflections in beams under various loading and support conditions
- To classify cylinders based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure.

Course Outcomes:

- The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions
- The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
- The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
- The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lamé's equation.

SYLLABUS:

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

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

UNIT - II: Shear Force And Bending Moment: Definition of beam - Types of beams - Concept of shear force and bending moment - S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads - Point of contraflexure - Relation between S.F., B.M and rate of loading at a section of a beam

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

Shear Stresses: Derivation of formula - Shear stress distribution across various beam sections like rectangular, circular, triangular, L, T angle sections, built up beams, shear centre

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

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

Thick Cylinders: Introduction Lame's theory for thick cylinders - Derivation of Lame's formulae - distribution of hoop and radial stresses across thickness - design of thick cylinders - compound cylinders

TEXT BOOKS:

1. Strength of Materials by Strength of materials, R. K. Rajput, S: Chaud. & Co., New Delhi
2. Strength of Materials by S. Ramamurtham,

REFERENCES:

1. Strength of Materials by R.K Bansal, Lakshmi Publications
2. Strength of Materials by R. Subramanian, Oxford Publications

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(Ch. Anis dhar Kumar)

II Year - I Semester

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BUILDING MATERIALS, PLANNING & CONSTRUCTION

Objectives of the course:

- Initiating the student with the knowledge of basic building materials and their properties.
- Imparting the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped and flat roofs.
- The student is to be exposed to the various patterns of floors, walls, different types of paints and varnishes.
- Imparting the students with the techniques of formwork and scaffolding.
- The students should be exposed to classification of aggregates, moisture content of the aggregate. Initiating the student to different building bye-laws and regulations.
- Imparting the planning aspects of residential buildings and public buildings.
- Giving training exercises on various signs and bonds and different building units.
- Imparting the skills and methods of planning of various buildings.

Course outcome:

Upon the successful completion of the course:

- The student should be able to identify different building materials and their importance in building construction.
 - The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions.
 - The student should have learnt the importance of building components and finishings.
 - The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.
- Upon successful completion of the course:
- Student should be able to plan various buildings as per the building by-laws.
 - The student should be able to distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
 - The student is expected to learn the skills of drawing building elements and plan the buildings as per requirements.

UNIT I:

Stones, Bricks, Tiles and Masonry: Properties of building stones, classification of stones – stone quarrying, various methods of manufacturing of bricks. Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials.

Masonry Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls. **Wood:** Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings, Alternative materials for wood – Galvanized Iron, Fiber Reinforced Plastics, Steel, Aluminium. Alternative materials for wood – Galvanized Iron, Fiber Reinforced Plastics, Steel, Aluminium.

UNIT II :

Lime And Cement Lime: Various ingredients of lime, various methods of manufacture of lime. **Cement:** Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties, Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete. **Building Components** Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs, Trussed roofs – King and Queen post Trusses, R.C.C Roofs, Madras Terrace and Pre fabricated roofs.

UNIT III:

Finishings Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distemping. **Paints:** Constituents of a paint – Types of paints – Painting of new/old wood- Varnish. **Form Works and Scaffolding.** **Aggregates** Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate- Bulking of sand – Sieve analysis.

UNIT IV:

Building Byelaws and Regulations Introduction- terminology- objectives of building byelaws- floor area ratio- floor space index- principles under laying building bye

laws- classification of buildings- open space requirements – built up area limitations- height of buildings- wall thickness – lightening and ventilation requirements.

UNIT V:

Residential Buildings Minimum standards for various parts of buildings requirements

of different rooms and their grouping- characteristics of various types of residential buildings and relationship between plan, elevation and forms and functions.

Public Buildings Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels and motels, buildings for recreation,

Landscaping requirements.

Text Books:

1. Building Materials, S. S. Bhavikatti, Vides publications House private ltd.
2. Building Materials, B. C. Punmia, Laxmi Publications private ltd.
3. Planning, designing and Scheduling, Gurucharan Singh and Jagadish Singh
4. Building planning and drawing by M. Chakravarti.

References:

1. Building Materials, S. K. Duggal, New Age International Publications.
2. Building Materials; P. C. Verghese, PHI learning (P) Ltd.
3. Building Materials, M. L. Gambhir, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Building drawing, M G Shah, C M Kala and S Y Palki, Tata McGraw Hill, New Delhi.
5. Principles of Building Drawing, M G Shah and C M Kala, Trinity Publications, New Delhi.
6. Civil Engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.

H. K. Kulkarni
Printed

C. K. Kulkarni

T. Kulkarni

STRENGTH OF MATERIALS LAB

List of Experiments

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

List of Major Equipment:

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

MSR *Chandya*
Prakash
T. K. Sankar

II Year - I Semester

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SURVEYING FIELD WORK-I

List of Field Works:

1. Survey by chain survey of road profile with offsets in case of road widening.
2. Survey in an area by chain survey (Closed circuit)
3. Determination of distance between two inaccessible points by using compass.
4. Finding the area of the given boundary using compass (Closed Traverse)
5. Plane table survey, finding the area of a given boundary by the method of Radiation
6. Plane table survey, finding the area of a given boundary by the method of intersection.
7. Two Point Problem by the plane table survey.
8. Fly levelling : Height of the instrument method (differential levelling)
9. Fly levelling; rise and fall method.
10. Fly levelling; closed circuit/ open circuit.
11. Fly levelling; Longitudinal Section and Cross sections of a given road profile.

Note: Any 10 field work assignments must be completed.



TKendal





APPENDIX-C5

B.Tech (R19) DCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF BS&HSS

UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA

VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech II Year I or II Semester

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Environmental Science

(Common to all Branches)

Course Objectives:

- To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.


UNIT - I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance - Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources - Natural resources and associated problems - Forest resources - Use and over - exploitation, deforestation, case studies - 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, case studies - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies - Energy resources.

UNIT - II: ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION

Ecosystems: Concept of an ecosystem - Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)


Dr. S. Kalesha Vali


Dr. S. Satyavani

Biodiversity and its Conservation : Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – III: Environmental Pollution and Solid Waste Management

Environmental Pollution: Definition, Cause, effects and control measures of : Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.


UNIT – IV: SOCIAL ISSUES AND THE ENVIRONMENT


Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain-water harvesting, watershed management – Resettlement and rehabilitation of people, its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V: HUMAN POPULATION AND THE ENVIRONMENT

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

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, and birds – river, hill slopes, etc..


Dr. S. Kalesha Vali


Dr. S. Satyavari

B.Tech. (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM – 535003, ANDHRA PRADESH, INDIA

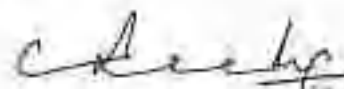
B.Tech. COURSE STRUCTURE (2019 admitted batch)

II. B.TECH II SEMESTER

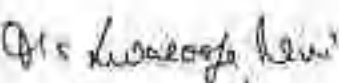
S.NO	Code	COURSE TITLE	POs	L	T	P	C
1	PC	Strength of Materials - II		3			3
2	BS	Complex variables & Statistical Methods		3			3
3	PC	Concrete Technology		3			3
4	PC	Hydraulics and Hydraulic Machinery		3			3
5	PC	Transportation Engineering - I		3			3
6	PC	Structural Analysis - I		3			3
		Labs					
7	PC	Surveying Field work - II				3	1.5
8	PC	Fluid Mechanics & Hydraulic Machines Lab				3	1.5
		Mandatory Courses					
9	PROJ	Industry Oriented Mini Project					0.5
10	MC	IPR & Patents		3			0
						Total Credits	21.5

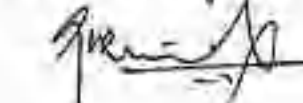
BOS MEMBERS:

1. Dr. Ch. Srinivasa Rao
2. Dr. G.V.R. Prasad Raju
3. Dr. M. Swaroopa Rani
4. Dr. G.V.R. Srinivasa Rao
5. Dr. A. Dali Naidu
6. Dr. Giridhar Rajesh B
7. Mr. P. Murali Krishna
8. Mr. T. Kondala Rao

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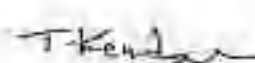
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STRENGTH OF MATERIALS-II

Course Learning Objectives:

- To give concepts of Principal stresses and strains developed in cross section of the beams on the cross section and stresses on any inclined plane. To impart concepts of failures in the material considering different theories
- To give concepts of torsion and governing torsion equation, and there by calculate the power transmitted by shafts and springs and design the cross section when subjected to loading using different theories of failures.
- To classify columns and calculation of load carrying capacity and to assess stresses due to axial and lateral loads for different edge conditions and to calculate combined effect of direct and bending stresses on different engineering structures
- Introduce the concept of unsymmetrical bending in beams Location of neutral axis. Deflection of beams under unsymmetrical bending.
- Impart concepts for determination of Forces in members of plane pin-jointed perfect trusses by different methods

Course Outcomes:

Upon successful completion of this course,

- The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.
- The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions
- The student will be able to assess forces in different types of trusses used in construction.

SYLLABUS:

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

Theories Of Failures: Introduction – 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.

UNIT – II: Torsion Of Circular Shafts And Springs: Theory of pure torsion – Derivation of Torsion equations; $T/l = q/r = Nq/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts –

Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

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

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

Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT – IV: Direct And Bending Stresses: Stresses under the combined action of direct loading and B.M. 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 B.M. about both axis.

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

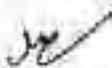
UNIT – V: Analysis Of Pin-Jointed Plane Frames: Determination of Forces in members of plane pin-jointed perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by method of joints, method of sections.

Text Books:

1. Mechanics of Materials – by R. C. Hibbler
2. Strength of materials by R. K. Rajput, S. Chand and Co.

References:

1. Strength of Materials by R. Subramanian, Oxford Publications.
2. Mechanics of Materials by B.C. Punmia, Jain and Jain.
3. Strength of materials by R. K. Bansal, Lakshmi Publications.


(Ch. Anindha Kumar)



APPENDIX – A5

B.Tech (R19) UCEV (Autonomous) w.e.f 2019-20

DEPARTMENT OF DS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech II Year - I or II Semester

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Complex Variables and Statistical Methods

(Common to ECE, EEE of II B.Tech-I Semester & Civil, ME, MET of II B.Tech-II Semester)

Course Objectives:

- To familiarize the complex variables.
- To familiarize the students with the foundations of probability and statistical methods.
- To equip the students to solve application problems in their disciplines.

UNIT-I: Functions of a complex variable and Complex integration: (10 hrs)

Introduction – Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates – Harmonic and conjugate harmonic functions – Milne – Thompson method.

Complex integration: Line integral – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula (all without proofs).

UNIT-II: Series expansions and Residue Theorem: (10 hrs)

Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series.

Types of Singularities: Isolated – pole of order m – Essential – Residues – Residue theorem


(without proof) – Evaluation of real integral of the type $\int_{-\infty}^{\infty} f(x) dx$

UNIT – III: Probability and Distributions: (10 hrs)

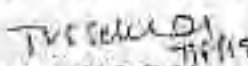
Review of probability and Baye's theorem – Random variables – Discrete and Continuous random variables – Distribution function – Mathematical Expectation and Variance – Binomial, Poisson, Uniform and Normal distributions.

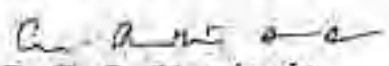
UNIT – IV: Sampling Theory: (8 hrs)

Introduction – Population and samples – Sampling distribution of Means and Variance (definition


1. Dr. Shaik Kalesha Vali


2. Dr. A V Papa Rao


Dr. T.V.S. Sekhar


Dr. Ch. Santhisundarraju

only) - Central limit theorem (without proof) - Introduction to χ^2 and F-distributions - Point and Interval estimations - Maximum error of estimate.

UNIT - V: Tests of Hypothesis:

(10 hrs)

Introduction - Hypothesis - Null and Alternative Hypothesis - Type I and Type II errors - Level of significance - One-tail and two-tail tests - Tests concerning one mean and two means (Large and Small samples) - Tests on proportions.

Course Outcomes: At the end of the course students will be able to

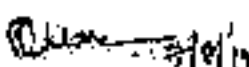
- apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic
- find the differentiation and integration of complex functions used in engineering problems
- make use of the Cauchy residue theorem to evaluate certain integrals
- apply discrete and continuous probability distributions
- design the components of a classical hypothesis test
- infer the statistical inferential methods based on small and large sampling tests


Text Books:

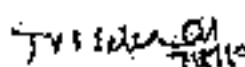
1. B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. Miller and Freund's, Probability and Statistics for Engineers, 7/e, Pearson, 2008.

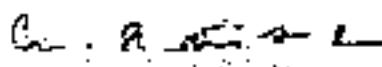
Reference Books:

1. S. C. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
2. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, Cengage.
3. Shiran L. Myers, Keying Ye, Ronald E Walpole, Probability and Statistics Engineers and the Scientists, 8th Edition, Pearson 2007.
4. Sheldon, M. Ross, Introduction to probability and statistics Engineers and the Scientists, 4th Edition, Academic Foundation, 2011


1. Dr. Shank Kalesha Valli


2. Dr. A.V. Papa Rao


Dr. T.V.S. Sekhar


Dr. Ch. Senthisundarraj

II Year - II Semester

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CONCRETE TECHNOLOGY

Course Learning Objectives:

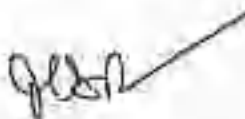
- To learn the concepts of Concrete production and its behaviour in various environments.
- To learn the test procedures for the determination of properties of concrete.
- To understand durability properties of concrete in various environments.

Course Outcomes:

- Upon successful completion of this course, student will be able to understand the basic concepts of concrete.
- Realize the importance of quality of concrete.
- Familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
- Test the fresh concrete properties and the hardened concrete properties.
- Evaluate the ingredients of concrete through lab test results. design the concrete mix by BIS method.
- Familiarize the basic concepts of special concrete and their production and applications. understand the behavior of concrete in various environments.

SYLLABUS:

UNIT I : Ingredients Of Concrete Cements & Admixtures: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume.



Aggregates: Classification of aggregate - Particle shape & texture - Bond, strength & other mechanical properties of aggregates - Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate - Bulking of sand - Deleterious substances in aggregate - Soundness of aggregate - Alkali aggregate reaction - Thermal properties - Sieve analysis - Flakiness modulus - Grading curves - Grading of fine & coarse Aggregates - Gap graded and well graded aggregate as per relevant IS code - Maximum aggregate size, Quality of mixing water.

UNIT - II, Fresh Concrete: Steps in Manufacture of Concrete - proportion, mixing, placing, compaction, finishing, curing - including various types in each stage. Properties of fresh concrete - Workability - Factors affecting workability - Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability - Segregation & bleeding - Mixing and vibration of concrete, Ready mixed concrete, Shotcrete.

Special Concretes: Ready mixed concrete, Shotcrete, Light weight aggregate concrete, Cellular concrete, No-fines concrete, High density concrete, Fibre reinforced concrete, Different types of fibres, Factors affecting properties of F.R.C, Polymer concrete, Types of Polymer concrete; Properties of polymer concrete, High performance concrete - Self consolidating concrete, SFCON, self healing concrete.

UNIT - III, Hardened Concrete: Water / Cement ratio - Abram's Law - Gel space ratio - Nature of strength of concrete - Maturity concept - Strength in tension & compression - Factors affecting strength - Relation between compression & tensile strength - Curing, Testing of Hardened Concrete: Compression tests - Tension tests - Factors affecting strength - Flexure tests - Splitting tests - Non-destructive testing methods - codal provisions for NDT.

UNIT - IV, Elasticity, Creep & Shrinkage, Modulus of elasticity, Dynamic modulus of elasticity, Poisson's ratio, Creep of concrete; Factors influencing creep, Relation between creep & time, Nature of creep, Effects of creep - Shrinkage - types of shrinkage.

UNIT - V, Mix Design: Factors in the choice of mix proportions - Durability of concrete - Quality Control of concrete - Statistical methods - Acceptance criteria - Concepts Proportioning of concrete mixed by various methods - BIS method of mix design.

Text Books:

1. Concrete Technology, M. S. Shetty, - S. Chand & Company
2. Concrete Technology, A. R. Santha Kumar, Oxford University Press, New Delhi

References:

1. Properties of Concrete, A. M. Neville - PEARSON - 4th edition
2. Concrete Technology, M.L. Gambhir - Tata Mc. Graw Hill Publishers, New Delhi

MSR

Pratap

Chandrabh

T. K. S. D. S.

II Year - II Semester

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HYDRAULICS AND HYDRAULIC MACHINERY

Course Learning Objectives:

- To study about uniform and non uniform flows in open channel and also to learn about the characteristics of hydraulic jump
- To introduce dimensional analysis for fluid flow problems
- To understand the working principles of various types of hydraulic machines and Pumps.

Course Outcomes:

Upon successful completion of this course the students will be able to:

- Solve uniform and non uniform open channel flow problems.
- Apply the principals of dimensional analysis and similitude in hydraulic model testing.
- Understand the working principles of various hydraulic machineries and pumps.

Syllabus:

UNIT – I UNIFORM FLOW & NON-UNIFORM FLOW IN OPEN CHANNELS

Types of channels –Types of flows - Velocity distribution – Energy and momentum correction factors – Chezy's, and Manning's formulae for uniform flow – Most Economical sections, Critical flow: Specific energy-critical depth – computation of critical depth
Steady Gradually Varied flow-Dynamic equation, Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT – II 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 stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle.

UNIT – IV HYDRAULIC TURBINES – I: Layout of a typical Hydropower installation – Heads and efficiencies - classification of turbines. Pelton wheel - Francis turbine - Kaplan turbine - working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and efficiency. Governing of turbines-surge tanks-unit and specific quantities, selection of turbines, performance characteristics-geometric similarity-cavitation.

UNIT - V. CENTRIFUGAL-PUMPS: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed, multistage pumps-pumps in parallel and series - performance of pumps-characteristic curves- NPSH- Cavitation.

RECIPROCATING PUMPS: Introduction, classification, components, working, discharge, indicator diagram, work done and slip.

Text Books:

1. Open Channel flow, K. Subramanya, Tata McGraw Hill Publishers
2. A text of Fluid mechanics and hydraulic machines, R. K. Bansal, Laxmi Publications New Delhi
3. Fluid Mechanics, Modi and Seth, Standard book house.

References:

1. Fluid Flow in Pipes and Channels, G.L. Asawa, CBS
2. Fluid Mechanics and Machinery, C.S.P. OJHA, R. BERNDTSSON and P.N. Chandramouli, Oxford Higher Education.
3. Fluid Mechanics and Machinery, Md. Kaleem Khan, Oxford Higher Education.

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II Year - II Semester

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TRANSPORTATION ENGINEERING-1

Course Learning Objectives:

The objectives of this course are:

- To impart different concepts in the field of Highway Engineering.
- To acquire design principles of Highway Geometrics and Pavements
- To learn various highway construction and maintenance procedures

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

- Plan highway network for a given area.
- Determine Highway alignment and design highway geometrics
- Design Intersections and prepare traffic management plans
- Judge suitability of pavement materials and design flexible and rigid pavements.
- Construct and maintain highways.

SYLLABUS:

UNIT I

Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans – First, second, third road development plans, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys; Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

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

UNIT – III Traffic Engineering: Basic Parameters of Traffic- Volume, Speed and Density- Traffic Volume Studies; Speed studies – spot speed and speed & delay studies; Parking Studies; Road Accidents- Causes and Preventive measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; Road Traffic Signs;

Road markings; Types of Intersections; At-Grade Intersections – Design of Plain, Flared, Rotary and Channelized Intersections; Design of Traffic Signals – Webster Method – IRC Method.

UNIT – IV, Highway Materials: Subgrade soil; classification – Group Index – Subgrade soil strength – California Bearing Ratio – Modulus of Subgrade Reaction. Stone aggregates; Desirable properties – Tests for Road Aggregates – Bituminous Materials: Types – Desirable properties. – Tests on Bitumen – Bituminous paving mixes: Requirements – Marshall Method of Mix Design. Types of Highway Construction – Earthwork; Construction of Earth Roads, Gravel Roads, Water Bound Macadam Roads, Bituminous Pavements and Construction of Cement Concrete Pavements. Pavement Failures, Maintenance of Highways, pavement evaluation, strengthening of existing pavements

UNIT – V, Design Of Pavements: Types of pavements; Functions and requirements of different components of pavements; Design Factors

Flexible Pavements: Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements.

Rigid Pavements: Design Considerations – wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements.

TEXT BOOKS:

1. Highway Engineering, Sharma S. K., Justo C. E. G and Venkatesh A, Nem Chaud Bros., Roorkee.
2. Traffic Engineering and Transportation Planning, Kadiyali L. R, Khanna Publishers, New Delhi.

REFERENCES:

1. Principles of Highway Engineering, Kadiyali L. R, Khanna Publishers, New Delhi
2. Principles of Transportation Engineering, Patna Chakraborty and Animesh Das, PHI Learning Private Limited, Delhi
3. Highway Engineering, Paul H. Wright and Karen K Dixon, Wiley Student Edition, Wiley India (P) Ltd., New Delhi
4. Practice and Design of Highway Engineering; Sharma S. K., Principles, S. Chand & Company Private Limited, New Delhi.

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C. Srinivas

II Year - II Semester

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STRUCTURAL ANALYSIS – I

Course Learning Objectives:

- To give preliminary concepts of assessment of bending moment and shear force in Propped cantilevers, fixed beams and continuous beams due to various loading conditions.
- To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions.
- The procedure for development of slope deflection equations and to solve application to continuous beams with and without settlement of supports.
- The concepts of moving loads and influence lines are imparted for assessment of maximum SF and BM at a given section when loads of varying spans rolling loads of Pratt and Warren trusses.

Course Outcomes:

Upon successful completion of this course the student will be able to,

- Distinguish between the determinate and indeterminate structures.
- Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure.
- Estimate the bending moment and shear forces in beams for different fixity conditions.
- Analyze the continuous beams using various methods - three moment method, slope deflection method, energy theorems.
- Draw the influence line diagrams for various types of moving loads on beams/bridges.
- Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.

Syllabus:

UNIT – I Propped Cantilevers: Analysis of propped cantilevers-shear force and Bending moment diagrams-Deflection of propped cantilevers.

Fixed Beams – Introduction to statically indeterminate beams with U. D. load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams-Deflection of fixed beams including effect of sinking of support, effect of rotation of a support.

UNIT - II Continuous Beams: Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans- Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-III Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

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 simple beams and pin jointed trusses. Unit Load Method

UNIT - V Moving Loads And Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M. due to single concentrated load, U.D. load longer than the span, U.D. load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a sections, single point load, U.D. load longer than the span, U.D. load shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

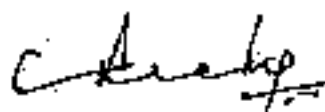
Text Books:

1. Basic Structural Analysis, C. S. Reddy Tata Mc.Graw-Hill, New Delhi.
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
3. Analysis of Structures- Vol. I and II, V. N. Vazirani and M. M. Rattwani, Khanna Publishers, New Delhi

References:

1. Theory of Structures, B. C. Punmia, A. K. Jain & Arun K. Jain, Lakshmi Publications
2. Theory of Structures, R.S. Khurmi, S. Chand Publishers.
3. Structural analysis by R.C. Hibbeler, Pearson, New Delhi.


T. K. Sreenivasulu Reddy


C. S. Reddy

SURVEY FIELD WORK- II

List of Experiments

1. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of repetition method.
2. Theodolite Survey: Finding the distance between two inaccessible points.
3. Theodolite Survey: Finding the height of far object.
4. Tacheometric Survey: Heights and distance problems using tacheometric principles.
5. One Exercise on Curve setting.
6. One Exercise on contours.
7. Total Station: Introduction to total station and practicing setting up, levelling up and elimination of parallax error.
8. Total Station: Determination of area using total station.
9. Total Station: Traversing
10. Total Station: Contouring
11. Total Station: Determination of Remote height.
12. Total Station: distance between two inaccessible points.

Note: Any 10 field work assignments must be completed.

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FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

List of Experiments

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
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. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

List of Equipment:

1. Venturimeter setup.
2. Orifice meter setup.
3. Small orifice setup.
4. External mouthpiece setup.
5. Rectangular and Triangular notch setups.
6. Friction factor test setup.
7. Bernoulli's theorem setup.
8. Impact of jets
9. Hydraulic jump test setup.
10. Pelton wheel and Francis turbines.
11. Centrifugal and Reciprocating pumps.

M.S.R.
Principal
R. Kendal

C. S. S. S.

APPENDIX-D6



B.Tech (R19) UCEV (Autonomous) W.E.2019-20
DEPARTMENT OF BS&HSS
UNIVERSITY COLLEGE OF ENGINEERING VIZAINAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINAADA
VIZAINAGARAM - 535 003, ANDHRA PRADESH, INDIA

B.Tech II Year I or II Semester

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INTELLECTUAL PROPERTY RIGHTS AND PATENTS

(Common to All Branches)

Course Objectives:

- To know the importance of Intellectual property rights, which plays a vital role in advanced Technical and Scientific disciplines.
- Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments.

Unit I: Introduction to Intellectual Property Rights (IPR)

Concept of Property - Introduction to IPR - International Instruments and IPR - WIPO - TRIPS - WTO - Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights - Industrial Property - Patents - Agencies for IPR Registration - Traditional Knowledge - Emerging Areas of IPR - Layout Designs and Integrated Circuits - Use and Misuse of Intellectual Property Rights.

Unit II: Copyrights and Neighboring Rights

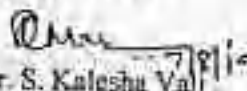
Introduction to Copyrights - Principles of Copyright Protection - Law Relating to Copyrights - Subject Matters of Copyright - Copyright Ownership - Transfer and Duration - Right to Prepare Derivative Works - Rights of Distribution - Rights of Performers - Copyright Registration - Limitations - Infringement of Copyright - Relief and Remedy - Case Law - Semiconductor Chip Protection Act.


UNIT III: Patents

Introduction to Patents - Laws Relating to Patents in India - Patent Requirements - Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights - Limitations - Ownership and Transfer - Revocation of Patent - Patent Appellate Board - Infringement of Patent - Compulsory Licensing - Patent Cooperation Treaty - New developments in Patents - Software Protection and Computer related Innovations.

UNIT IV: Trademarks

Introduction to Trademarks - Laws Relating to Trademarks - Functions of Trademark - Distinction between Trademark and Property Mark - Marks Covered under Trademark Law - Trade Mark Registration - Trade Mark Maintenance - Transfer of rights - Deceptive Similarities


Dr. S. Kalesha Valli


Dr. P. Sridhar


Dr. V. Krishna Mohan

Likelihood of Confusion - Dilution of Ownership - Trademarks Claims and Infringement - Remedies - Passing Off Action.

UNIT V: Trade Secrets & Cyber Law and Cyber Crime

Introduction to Trade Secrets - General Principles - Laws Relating to Trade Secrets -

Maintaining Trade Secret - Physical Security - Employee Access Limitation - Employee Confidentiality Agreements - Breach of Contract - Law of Unfair Competition - Trade Secret Litigation - Applying State Law.

Cyber Law - Information Technology Act 2008 - Protection of Online and Computer Transactions -


E-commerce - Data Security - Authentication and Confidentiality - Privacy - Digital Signatures - Certifying Authorities - Cyber Crimes - Prevention and Punishment - Liability of Network Providers.

Course Outcome:

- IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents.
- Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements.

References:

1. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas, Oxford University Press, New Delhi.
2. Deborah E. Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
3. Prabhakdra Ganguli: Intellectual Property Rights, Tata Mc-Graw -Hill, New Delhi
4. Richard Stim: Intellectual Property, Cengage Learning, New Delhi.
5. Kousal Bansal & Parshat Bansal Fundamentals of IPR for Engineers, B. S. Publications (Press).
6. Cyber Law - Texts & Cases, South-Western's Special Topics Collections.
7. R.Radha Krishnan, S.Balambramaniam: Intellectual Property Rights, Excel Books, New Delhi.
8. M.Ashok Kumar and Mohulqbal Ali: Intellectual Property Rights, Serials Pub.


Dr. S. Kalsha Valli


Dr. P. Srinivas


Dr. V. Krishna Mohan



DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM-535003, ANDHRA PRADESH, INDIA

B.Tech COURSE STRUCTURE (R19)

III Year – I Semester

S. No.	Code	Course	POs	L	T	P	Credits
1	PC	ENGINEERING GEOLOGY		3	0	0	3
2	PC	ENVIRONMENTAL ENGINEERING-I		3	0	0	3
3	PE	ELECTIVE -I <ul style="list-style-type: none">• CONSTRUCTION TECHNOLOGY MANAGMENT• URBAN HYDROLOGY• TRAFFIC ENGINEERING• REMOTE SENSING AND GIS APPLICATIONS		3	0	0	3
4	PC	DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES		3	0	0	3
5	PC	STRUCTURAL ANALYSIS-II		3	0	0	3
		LABS					
6	PC	CONCRETE TECHNOLOGY LAB		0	0	3	1.5
7	PC	ENGINEERING GEOLOGY LAB		0	0	3	1.5
8	PC	TRANSPORTATION ENGINEERING LAB		0	0	3	1.5
		TOTAL CREDITS					19.5

ENGINEERING GEOLOGY

Course Learning Objectives:

The objective of this course:

1. To introduce the Engineering Geology as a subject in Civil Engineering
2. To enable the student to use subject in civil engineering applications.
3. To know the Geological history of India.
4. Identify and classify the geological minerals
5. Measure the rock strengths of various rocks

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Classify and measure the earthquake prone areas to practice the hazardzonation
2. Classify, monitor and measure the Landslides and subsidence
3. Investigate the project site for mega/mini civil engineering projects. Sites election for mega engineering projects like Dams, Tunnels, disposal sites etc...
4. Prepares, analyses and interpret the Engineering Geological maps
5. Analyses the ground conditions through geophysical surveys.

SYLLABUS:

UNIT-I: Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies

Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

UNIT-II Mineralogy And Petrology: Definitions of mineral, Structures of silicates and rock, Different methods of study of mineral and rock, The study of physical properties of minerals and rocks for megascopic study for the following minerals and rocks, Common rock forming minerals are Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and other ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite And Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their megascopic study of granite varieties, (pink,

gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate and their importance in Civil Engineering.

UNIT-III Structural Geology: Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering–Indian stratigraphy. Aims of stratigraphy, Principles, Geological time scale, Geological division in India, Major stratigraphic units in India.

UNIT-IV Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Earthquakes And Land Slides: Terminology, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides. Case studies.

Geology of Dams, Reservoirs And Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

UNIT-V Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

Text Books:

1. Engineering Geology, N. ChennKesavulu, Laxmi Publications, 2nd Edition, 2014.
2. Engineering Geology, SubinoyGangopadhyay, Oxford Universitypress.
3. Engineering Geology, D. Venkat Reddy, Vikas Publishing House pvt. Ltd, 2013.

References:

1. Engineering Geology, Vasudev Kanithi, University Press.
2. Engineering Geology for Civil Engineers P. C. Varghese, PHI learning pvt.Ltd.
3. G Fundamentals of Engineering Geology' P.G. Bell, B. S. P. Publications, 2012

Web Link:

<https://nptel.ac.in/courses/105/105/105105106/>

ENVIRONMENTAL ENGINEERING- I

Course Learning Objectives:

The course will address the following:

1. Outline planning of water supply systems for a community/town/city
2. Provide knowledge of water quantity requirements its sources
3. Impart understanding of importance of water quality and treatment procedure
4. Design of water treatment plant for a village/city
5. Impart knowledge on design of water distribution network

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Estimation of design population and water demand
2. Identify the water source and select proper intake structure
3. Characterization of water for drinking, industry and construction
4. Design of water treatment plant for a village/city
5. Selection and design of an ideal distribution system

UNIT-I Introduction: Importance and Necessity of Protected Water Supply systems, Water borne diseases, Flow chart of public water supply system, Role of Environmental Engineer. Evolution of water supply system.

Water Demand and Quantity Estimation: Estimation of water demand for a town or city, Per capita Demand and factors influencing it - Types of water demands and its variations- factors affecting water demand, Design Period, Factors affecting the Design period, Population forecasting.

UNIT-II Sources of Water: Lakes, Rivers, Impounding Reservoirs, comparison of sources with reference to quality, quantity and other considerations- Capacity of storage reservoirs, Mass curve analysis. Groundwater sources of water: Types of water bearing formations, springs, Wells and Infiltration galleries, Yields from infiltration galleries.

Collection and Conveyance of Water: Factors governing the selection of the intake structure, Types of Intakes. Conveyance of Water: Gravity and Pressure conduits, Types of Pipes, Pipe Materials, Pipe joints, Design aspects of pipe lines, laying of pipelines

UNIT-III Quality and Analysis of Water: Characteristics of water– Physical, Chemical and Biological. Analysis of Water – Physical, Chemical and Biological characteristics. Comparison of sources with reference to quality- IS 10500 2012 and WHO guidelines for drinking water - Water quality standards for Agriculture, Industries and Construction

UNIT-IV Treatment of Water: Treatment methods: Theory and Design of Sedimentation, Coagulation, Sedimentation with Coagulation, Filtration

Disinfection: Theory of disinfection-Chlorination and other Disinfection methods, Softening of Water, Removal of color and odors- Removal of Iron and Manganese - Adsorption- Fluoridation and

defluoridation– Aeration–Reverse Osmosis- Ion exchange– Ultra filtration

UNIT–V Distribution of Water: Requirements- Methods of Distribution system, Layouts of Distribution networks, Pressures in the distribution layouts, Analysis of Distribution networks: Hardy Cross and equivalent pipe methods -Components of Distribution system: valves such as sluice valves, air valves, scour valves and check valves, hydrants, and water meters, selection of pipe materials, pipe joints. Ideal water supply system. Case studies.

Text Books

1. Rural, Municipal and Industrial Water Management, KVSG Murali Krishna, Reem Publications, New Delhi, 2012
2. Elements of Environmental Engineering – K. N. Duggal, S. Chand & Company Ltd., New Delhi, 2012.
3. Water Supply and Sanitary Engineering – G. S. Birdie and J. S. Birdie

References

1. Environmental Engineering – Howard S. Peavy, Donald R. Rowe, George Tchobanoglous – Mc- Graw-Hill Book Company, New Delhi, 1985.
2. Water Supply Engineering – P. N. Modi.
3. Water Supply Engineering – B. C. Punmia

Web Link

<https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ge22/>

CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Course Learning Objectives:

The objective of this courses:

1. To introduce to the student the concept of project management including network drawing and monitoring
2. To introduce various equipments like earth moving equipment, trucks and handling equipment, aggregate production and construction equipment and machinery, related to construction.
3. To introduce the importance of safety in construction projects
4. Methods of production of aggregate products and concreting
5. Usage of machinery required for the works

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Appreciate the importance of construction planning
2. Understand the functioning of various earth moving equipment
3. Know the methods of production of aggregate products and concreting and usage of machinery required for the works.
4. Apply the gained knowledge to project management and construction techniques
5. Trucks and handling equipment, aggregate production and construction equipment and machinery

SYLLABUS:

UNIT- I Construction project management and its relevance – qualities of a project manager – project planning – coordination – scheduling - monitoring – bar charts – milestone charts – critical Path Method – Applications

UNIT -II Project Evaluation and Review Technique – cost analysis - updating – crashing for optimum cost – crashing for optimum resources – allocation of resources

UNIT- III Construction equipment – economical considerations – earthwork equipment – Trucks and handling equipment – rear dump trucks – capacities of trucks and handling equipment – calculation of truck production – compaction equipment – types of compaction rollers

UNIT -IV Hoisting and earthwork equipment – hoists – cranes – tractors - bulldozers – graders –

scrapers– draglines - clamshell buckets

UNIT -V Concreting equipment – crushers – jaw crushers – gyratory crushers – impact crushers – selection of crushing equipment - screening of aggregate – concrete mixers – mixing and placing of concrete – consolidating and finishing

Construction methods – earthwork – piling – placing of concrete – form work – fabrication and erection – quality control and safety engineering

Text Books:

1. Construction Planning Equipment and Methods, Peurifoy and Schexnayder ,Shapira, TataMcgrawhill
2. Construction Project Management Theory and Practice, Kumar Neeraj Jha (2011), Pearson.
3. Construction Technology, SubirK. Sarkar and SubhajitSaraswati, Oxford University press.

References:

1. Construction Project Management - An Integrated Approach, Peter Fewings ,Taylor andFrancis
2. Construction Management Emerging Trends and Technologies, TreforWilliams , Cengagelearning.
3. Hand Book of Construction Management, P. K. Joy, Trinity Press Chennai, New Delhi.

Web Link:

<https://nptel.ac.in/courses/105/103/105103093>

URBAN HYDROLOGY

Course Learning Objectives:

The course is designed to:

1. Appreciate the impact of urbanization on catchment hydrology
2. Understand the importance of short duration rainfall runoff data for urban hydrology studies.
3. Learn the techniques for peak flow estimation for storm water drainage system design.
4. Understand the concepts in design of various components of urban drainage systems.
5. Learn some of the best management practices in urban drainage.

Course Outcomes

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

1. Develop intensity duration frequency curves for urban drainage systems.
2. Develop design storms to size the various components of drainage systems.
3. Apply best management practices to manage urban flooding.
4. Prepare master drainage plan for an urbanized area.
5. Practice best management in urban drainage.

SYLLABUS:

UNIT I

Introduction: Urbanisation and its effect on water cycle – urban hydrologic cycle – trends in urbanisation – Effect of urbanisation on hydrology.

UNIT II

Precipitation Analysis: Importance of short duration of rainfall and runoff data, methods of estimation of time of concentration for design of urban drainage systems, Intensity-Duration -Frequency (IDF) curves, design storms for urban drainage systems.

UNIT III

Approaches to urban drainage: Time of concentration, peak flow estimation approaches , rational method, NRCS curve number approach, runoff quantity and quality, wastewater and stormwater reuse , major and minor systems.

UNIT IV

Elements of drainage systems: Open channel, underground drains, appurtenances, pumping, source control.

UNIT V

Analysis and Management: Stormwater drainage structures, design of stormwater network- Best Management Practices–detention and retention facilities, swales, constructed wetlands, models available for stormwater management.

TEXT BOOKS:

1. 'Manual on Drainage in Urbanised area' by Geiger W. F., J Marsalek, W. J. Rawls and F. C. Zuidema, (1987 - 2 volumes), UNESCO,
2. 'Urban Hydrology' by Hall M J (1984), Elsevier Applied Science Publisher.
3. 'Hydrology – Quantity and Quality Analysis' by Wanielista M P and Eaglin (1997), Wiley and Sons.

REFERENCES:

1. 'Stormwater Detention for Drainage' by Stahre P and Urbonas B (1990), Water Quality and CSO Management, Prentice Hall.
2. 'Urban water cycle processes and interactions' by Marsalek et al (2006), Publication No. 78, UNESCO, Paris (<http://www.bvsde.paho.org/bvsacd/cd63/149460E.pdf>)
3. 'Frontiers in Urban Water Management – Deadlock or Hope' by Maksimovic C and J A Tejada-Guibert (2001), IWA Publishing.

Web Link

<https://nptel.ac.in/courses/105/101/105101002>

TRAFFIC ENGINEERING

Course objectives:

To provide engineering techniques to achieve the safe and efficient movement of people and goods on roadways.

1. Understand basics principles of traffic engineering
2. Analyze parking data and model accidents
3. Determine capacity and los.
4. To provide engineering techniques to achieve safe movement
5. To provide people and goods safe means of transport on roadways

Course outcomes: at the end of the course, the student will be able:

1. To Understand basics principles of traffic engineering
2. To Analyze parking data and model accidents
3. To Determine capacity and los.
4. To provide engineering techniques to achieve safe and efficient movement
5. To Provide people safe means of transport and goods on roadways

UNIT - I

Traffic studies (part- i) : basic principles of traffic, volume, speed and density; definitions and their interrelationships; traffic volume studies - objectives, methods of volume counts, presentation of volume data; speed studies- types of speeds, objectives, methods of speed studies, statistical methods for speed data analysis, presentation of speed data. Delay studies; head ways and gap studies - headway and gap acceptance, origin and destination studies.

UNIT - II

Traffic studies (part-ii) : parking studies: parameters of parking, definitions, parking inventory study, parking survey by patrolling method; analysis of parking survey data; accident studies- causative factors of road accidents, accident data collection: accident analysis and modeling;, road safety auditing, measures to increase road safety.

UNIT - III

Capacity and los analysis: introduction to traffic capacity, analysis concepts, level of service, basic definitions, factors affecting capacity and los, capacity of urban/rural highway, with or without access control, basic freeway segments - service flow rate of los, lane width or lateral clearance adjustment; heavy vehicle adjustment; driver population adjustment.

UNIT - IV

Signal designing – fixed time signals, determination of optimum cycle length and signal setting for fixed time signals, warrants for signals, time plan design for pre-timed control- lane group analysis, saturation flow rate, and adjustment factors, uniform and incremental delay, vehicle

actuated signals, signal coordination.

UNIT - V

Transportation system management - measures for improving vehicular flow – one way streets, signal improvement, transit stop relocation, parking management, reversible lanes- reducing peak period traffic - strategies for working hours, congestion pricing, differential toll policies.

Text Books:

1. Traffic engineering and transportation planning – I.R. Kadiyali, Khanna Publishers
2. Principles of highways engineering and traffic analysis - Fred Mannering & Walter Kilareski, John Wiley & Sons publication

References:

1. Traffic engineering - theory & practice - Louis J. Pignataro, Prentice Hall publication.
Traffic engineering by Roger P. Roess, William R. Mc. Shane, Elena S. Prassas, Prentice Hall, 1977

Weblink:

[https://nptel.ac.in/courses/105/101/105101008 /](https://nptel.ac.in/courses/105/101/105101008/)

REMOTE SENSING & GIS APPLICATIONS

Course Learning Objectives:

The course is designed to

1. Introduce the basic principles of Remote Sensing and GIS techniques.
2. learn various types of satellite sensors and platforms
3. learn concepts of visual and digital image analyses
4. understand the principles of spatial analysis
5. appreciate application of RS and GIS to Civil engineering

Course outcomes

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

1. Be familiar with ground, air and satellite based sensor platforms.
2. interpret the aerial photographs and satellite imageries
3. create and input spatial data for GIS application
4. apply RS and GIS concepts in water resources engineering
5. applications of various satellite data

Syllabus:

Unit – I Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces, Characteristics of remote sensing systems

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics.

Unit – II Image analysis: Introduction, elements of visual interpretations, digital image processing- image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

Unit – III Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

Unit – IV Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators.

RS and GIS applications General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications,

Unit – V Applications of Hydrology, Water Resources and Disaster Management: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management and disaster management with case studies.

Text Books:

1. Remote sensing and GIS, Bhatta B (2008) , Oxford University Press
2. Remote Sensing and Image Interpretation, Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013), Wiley India Pvt. Ltd., New Delhi
3. Fundamentals of Geographic Information Systems, Demers, M.N, Wiley India Pvt. Ltd, 2013.

References:

1. Fundamentals of Remote Sensing, George Joseph, Universities Press, 2013.
2. Concepts and Techniques of Geographical Information System, Chor Pang Lo and A K W Yeung, Prentice Hall (India), 2006
3. Remote Sensing and its Applications, Narayan LRA, Universities Press, 2012.

Web Link:

1. <https://nptel.ac.in/courses/105/103/105103193/>

DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES

Course Learning Objectives:

The objective of this course is:

1. Familiarize Students with different types of design philosophies
2. Equip student with concepts of design of flexural members
3. Understand Concepts of shear, bond and torsion
4. Familiarize students with different types of compressions members and Design
5. Understand different types of footings and their design

Course Outcomes:

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

1. Work on different types of design philosophies
2. Carryout analysis and design of flexural members and detailing
3. Design structures subjected to shear, bond and torsion
4. Design different type of compression members and footings
5. Design one way and two way slabs

Syllabus:

UNIT –I Introduction:

a) **Working stress method:** Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, Elastic theory: design constants, modular ratio, neutral axis depth and moment of resistance for balanced, under-reinforced and over-reinforced sections. Design of singly and doubly reinforced beams.

b) **Limit State Design:** Concepts of limit state design – Basic statistical principles – Characteristic loads – Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance.

All units i.e. from unit II to unit VI are to be taught in Limit State Design.

UNIT –II Design for Flexure: Limit state analysis and design of singly reinforced sections- effective depth- Moment of Resistance- Doubly reinforced and flanged (T and L) beam sections- Minimum depth for a given capacity- Limiting Percentage of Steel- Minimum Tension Reinforcement-Maximum Flexural Steel- Design of Flanged Sections (T&L)- Effective width of flange –Behavior- Analysis and Design.

UNIT – III Design for Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

Limit state design for serviceability: Deflection, cracking and code provision, Design of formwork for beams and slabs.

UNIT – IV Slabs: Classification of slabs, design of one - way slabs, one way continuous slab using IS Coefficients (Conventional) –Design of two - way slabs-simply supported and various edge conditions using IS Coefficients .

UNIT – V Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending.

Footings: Different types of footings – Design of isolated footings – pedestal, square, rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

Note: All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement detailing of T-beams, L-beams and continuous beams.
2. Reinforcement detailing of columns and isolated footings.
4. Detailing of one-way, two-way and continuous slabs and waist-slab staircase.

Final Examination Pattern:

The end examination paper should consist of Part A and Part B. Part A consists of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

Text Books:

1. Limit State Design for Reinforced concrete Structures by A. K. Jain
2. Design of Reinforced concrete Structures by N. Subrahmanyian
3. Reinforced Concrete Structures, S. Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.

References:

1. R C C Design, B.C Punmia, A. K. Jain and A. K Jain. Lakshmi Publications
2. Reinforced Concrete Structures, N. Krishna Raju & R. N. Pranesh, New Age Publications.

IS Codes:

- 1) IS -456-2000 Code of practice for Reinforced Concrete Structures (Permitted to use in examination hall)
- 2) IS – 875
- 3) SP-16

Web link:

1. <https://nptel.ac.in/courses/105/105/105105104/> (NPTEL Web Link)
2. [https://www.udemy.com/course/basic-design-of-reinforced-concrete-structures/\(udemy course\)](https://www.udemy.com/course/basic-design-of-reinforced-concrete-structures/(udemy%20course))

STRUCTURAL ANALYSIS – II

Course Learning Objectives:

The objective of this course is:

1. Familiarize Students with Different types of Structures
2. Equip student with concepts of Arches
3. Understand Concepts of lateral Load analysis
4. Familiarize Cables and Suspension Bridges
5. Understand Analysis methods Moment Distribution, Kani's Method and Matrix methods

Course Outcomes:

1. At the end of this course; the student will be able to
2. Differentiate Determinate and Indeterminate Structures
3. Carryout lateral Load analysis of structures
4. Analyze Cable and Suspension Bridge structures
5. Analyze structures using Moment Distribution, Kani's Method and Matrix methods

SYLLABUS:

UNIT I Three Hinged Arches: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature. Hinges with supports at different levels.

Two Hinged Arches: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, Tied arches – Fixed arches – (No analytical question).

UNIT-II, Lateral Load Analysis Using Approximate Methods: application to building frames. (i) Portal Method (ii) Cantilever Method.

Cable Structures and Suspension Bridges: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses.

UNIT – III Moment Distribution Method: Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports.

Portal frames – including Sway-Substitute frame analysis by two cycle.

UNIT –IV Kani's Method: Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

UNIT – V Introduction to Matrix Methods: *Flexibility methods*: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

Stiffness method: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

Text Books:

1. Structural Analysis, T. S. Thandavamoorthy, Oxford university press, India.
2. Structural Analysis, R.C. Hibbeler, Pearson Education, India
3. Theory of Structures – II, B. C. Punmia, Jain & Jain, Laxmi Publications, India.
4. Structural Analysis, C.S. Reddy, Tata Mc-Graw hill, New Delhi.

References:

1. Intermediate Structural Analysis, C. K. Wang, Tata McGraw Hill, India
2. Theory of structures, Ramamuratam, Dhanpatrai Publications.
3. Analysis of structures, Vazrani & Ratwani – Khanna Publications.
4. Comprehensive Structural Analysis-Vol. I & 2, R. Vaidyanathan & P. Perumal- Laxmi Publications Pvt. Ltd., New Delhi

Web link

<https://nptel.ac.in/courses/105/105/105105166/>

CONCRETE TECHNOLOGY LAB

Course Learning Objectives:

- To test the basic properties ingredients of concrete, fresh and hardened concrete properties

Course Outcomes:

Upon successful completion of this course, student will be able to

- Determine the consistency and fineness of cement.
- Determine the setting times of cement.
- Determine the specific gravity and soundness of cement.
- Determine the compressive strength of cement.
- Determine the workability of cement concrete by compaction factor, slump and Vee – Bee tests
- Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
- Determine the flakiness and elongation index of aggregates.
- Determine the bulking of sand.
- Understand the non-destructive testing procedures on concrete.

List of Experiments: At least 10 experiments must be conducted (at least one for each property)

1. Determination of normal Consistency and fineness of cement.
2. Determination of initial setting time and final setting time of cement.
3. Determination of specific gravity and soundness of cement.
4. Determination of compressive strength of cement.
5. Determination of grading and fineness modulus of Coarse aggregate by sieve analysis.
6. Determination of specific gravity of coarse aggregate
7. Determination of grading and fineness modulus of fine aggregate (sand) by sieve analysis.
8. Determination of bulking of sand.
9. Determination of workability of concrete by compaction factor method.
10. Determination of workability of concrete by slump test
11. Determination of workability of concrete by Vee-bee test.
12. Determination of compressive strength of cement concrete and its young's modulus.

13. Determination of split tensile strength of concrete.

14. Non-Destructive testing on concrete (for demonstration)

List of Equipment:

1. Standard set of sieves for coarse aggregate and fine aggregate

2. Vicat's apparatus

3. Specific gravity bottle.

4. Lechatlier's apparatus.

5. Slump Test Apparatus.

6. Compaction Factor Test Apparatus.

7. Vee- Bee test apparatus

8. Longitudinal compresso meter

9. Universal testing Machine (UTM)/Compression Testing Machine (CTM).

10. Rebound hammer, Ultrasonic pulse velocity machine, micro cover meter etc.

ENGINEERING GEOLOGY LAB

Course Learning Objectives:

The objective of this courses:

1. To identify the mega-scopic types of Ore minerals & Rock forming minerals.
2. To identify the mega-scopic types of Igneous, Sedimentary, Metamorphic rocks.
3. To identify the topography of the site & material selection
4. Identify Mega-scopic rocks & their properties.
5. Identify Dip & Strike .

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Identify Mega-scopic minerals & their properties.
2. Identify Mega-scopic rocks & their properties.
3. Identify the site parameters such as contour, slope & aspect fortography.
4. Know the occurrence of materials using the strike & dip problems.
5. Know Folds & Faults

SYLLABUS:

List of Experiments

1. Physical properties of minerals: Mega-scopic identification of
 - a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum,etc...
 - b. Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite,etc...
2. Megasopic description and identification ofrocks.
 - a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite,Granite Poryphery, Basalt,etc...
 - b) Sedimentary rocks – Sand stone, Ferruginous sand stone, Lime stone,Shale, Laterite, Conglamorate, etc...

- c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotite schist, Marble, Khondalite, etc...
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
4. Simple Structural Geology problems.
5. Bore hole data.
6. Strength of the rock using laboratory tests.
7. Field work – To identify Minerals, Rocks, Geomorphology & Structural Geology.

LAB EXAMINATION PATTERN:

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology.

REFERENCE:

1. Applied Engineering Geology Practical, M. T. Mauthesha Reddy, NewAge International Publishers, 2nd Edition.
2. Foundations of Engineering Geology' by Tony Waltham , Spon Press

TRANSPORTATION ENGINEERING LAB

Course Learning Objectives:

The objective of this course is:

1. To test crushing value, impact resistance, specific gravity and water absorption, percentage attrition, percentage abrasion, flakiness index and elongation index for the given road aggregates.
2. To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.
3. To test the stability for the given bitumen mix
4. To carry out surveys for traffic volume, speed and parking.

Course outcomes:

1. Ability to test aggregates and judge the suitability of materials for the road construction
2. Ability to test the given bitumen samples and judge their suitability for the road construction
3. Ability to obtain the optimum bitumen content for the mix design
4. Ability to determine the traffic volume, speed and parking characteristics.

SYLLABUS:

I. ROAD AGGREGATES:

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

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.
5. Stripping Test
6. Viscosity Test.

III. BITUMINOUS MIX:

1. Marshall Stability test.

IV. TRAFFIC SURVEYS:

1. Traffic volume study at mid blocks.
2. Traffic Volume Studies (Turning Movements) at intersection.

3. Spot speed studies.
4. Parking study.

V. DESIGN & DRAWING:

1. Earthwork calculations for road works.
2. Drawing of road cross sections.
3. Rotors intersection design.

LIST OF EQUIPMENT:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Deval's Attrition test machine
6. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus
10. Viscometer.
11. Marshal Mix design apparatus.
12. Enoscope for spot speed measurement.
13. Stop Watches

SOFTWARE:

- Introduction to Arc Gis
- Introudction to IIT PAVE
- Introduction to MX Roads
- Introduction to VISSIM

Text Books:

1. Highway Material Testing Manual, S. K. Khanna, C. E. G Justo and A. Veeraraghavan, Neam Chan Brothers New Chand Publications, New Delhi.

Reference Books:

1. I R C Codes of Practice
2. Asphalt Institute of America Manuals
3. Code of Practice of B.I.S.



DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM (Autonomous)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
VIZIANAGARAM-535003, ANDHRA PRADESH, INDIA.

B.Tech COURSE STRUCTURE (2019 Admitted batch)

III B.Tech – II Semester

S. No.	Code	Course	POs	L	T	P	Credits
1	PC	GEOTECHNICAL ENGINEERING -I		3	0	0	3
2	PC	WATER RESOURCE ENGINEERING-I		3	0	0	3
3	PC	DESIGN AND DRAWING OF STEEL STRUCTURES		3	0	0	3
4	PC	ENVIRONMENTAL ENGINEERING -II		3	0	0	3
5	OE	OPEN ELECTIVE -I <ul style="list-style-type: none">• FUNDAMENTALS OF ENTREPRENEURSHIP• EARTHQUAKE ENGINEERING• SOLID & HAZARDOUS WASTE MANAGEMENT		3	0	0	3
6	PE	ELECTIVE -II <ul style="list-style-type: none">• GREEN BUILDING TECHNOLOGY• ENVIRONMENTAL POLLUTION AND CONTROL• OFF SHORE STRUCTURES• GROUNDWATER DEVELOPMENT		3	0	0	3
		LABS					
7	PC	ENVIRONMENTAL ENGINEERING LAB		0	0	3	1.5
8	PC	GEOTECHNICAL ENGINEERING LAB		0	0	3	1.5
		MANDATORY COURSE					
9	PROJ	SEMINAR ON INTERNSHIP		0	0	0	0.5
		TOTAL CREDITS					21.5

GEOTECHNICAL ENGINEERING – I

Course Learning Objectives:

The objective of this course is:

1. To enable the student to find out the index properties of the soil and classify it.
2. To impart the concept of seepage of water through soils and determine the seepage discharge.
3. To enable the students to differentiate between compaction and consolidation of soils and to determine the magnitude and the rate of consolidation settlement.
4. To enable the student to understand the concept of shear strength of soils
5. To assess of the shear parameters of sands and clays and the areas of their application.

Course Outcomes:

Upon the successful completion of this course

1. The student must know the definition of the various parameters related to soil mechanics and establish their inter-relationships.
2. The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
3. The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability
4. To understand the concept of consolidation and shear strength and determine them in the laboratory.
5. The student should be able to apply the above concepts in day-to-day civil engineering practice.

SYLLABUS:

UNIT – I Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass-volume relationship –Relative density , Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.

Index Properties of Soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

UNIT –II Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy’s law- permeability – Factors affecting –laboratory determination of coefficient of permeability – Permeability of layered systems. Total, neutral and effective stresses –quick sand condition – 2-D flow and Laplace’s equation - Seepage through soils – Flow nets: Characteristics and Uses.

UNIT – III Stress Distribution In Soils: Stresses induced by applied loads - Boussinesq’s and Westergaard’s theories for point loads and areas of different shapes– Newmark’s influence chart – 2:1 stress distribution method.

UNIT – IV Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring Analogy - Terzaghi’s theory of one- dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (c_v) - Over consolidated and normally consolidated clays.

UNIT – V Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress- Strain behavior of clays – Shear Strength determination- various drainage conditions.

Text Books:

1. Basic and Applied Soil Mechanics, Gopal Ranjan and A. S. R. Rao, New Age International Publishers.
2. Soil Mechanics and Foundation Engineering, V. N. S. Murthy, CBS publishers

References:

1. Fundamentals of Soil Mechanics, D. W. Taylor, Wiley.
2. An introduction to Geotechnical Engineering, Holtz and Kovacs; Prentice Hall.
3. Fundamentals of Geotechnical Engineering, B M Das, Cengage Learning, New Delhi.

Web link

<https://nptel.ac.in/courses/105/105/105105185/>

WATER RESOURCES ENGINEERING–I

Course Learning Objectives:

The course is designed to

1. Introduce hydrologic cycle and its relevance to Civil engineering.
2. Make the students understand physical processes in hydrology and, components of the hydrologic cycle.
3. Appreciate concepts and theory of physical processes and interactions.
4. Learn measurement and estimation of the components hydrologic cycle.
5. Provide an overview and understanding of Unit Hydrograph theory and its analysis.

Course Outcomes:

At the end of the course the students are expected to

1. Have a thorough understanding of the theories and principles governing the hydrologic processes.
2. Be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects.
3. Develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.
4. Be able to develop design storms and carry out frequency analysis.
5. Be able to determine storage capacity and life of reservoirs.

SYLLABUS:

UNIT I

Introduction: Engineering hydrology and its applications, Hydrologic cycle, hydrological data-sources of data.

Precipitation: Types and forms, measurement, raingauge network, presentation of rainfall data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves, Depth-Area-Duration (DAD) curves, Probable Maximum Precipitation (PMP), design storm.

UNIT-II

Abstractions from Precipitation: Initial abstractions. Evaporation: factors affecting, measurement, reduction Evapotranspiration: factors affecting, measurement, control

Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices.

UNIT-III

Runoff: Catchment characteristics, Factors affecting runoff, components, computation- empirical formulae, tables and curves, stream gauging, rating curve, flow mass curve and flow duration curve.

Hydrograph analysis:

Components of hydrograph, separation of base flow, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, derivation of unit hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of unit hydrograph, synthetic unit hydrograph.

UNIT-IV

Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearson type III distribution methods, Standard Project Flood (SPF) and Probable Maximum Flood (MPF), flood control methods and management. Flood Routing: Hydrologic routing, channel and reservoir routing- Muskingum and Puls methods of routing.

UNIT-V

Groundwater: Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation- steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

TEXT BOOKS:

1. 'Engineering Hydrology' by Subramanya, K, Tata Mc Graw-Hill Education Pvt. Ltd, (2013), New Delhi.
2. 'Engineering Hydrology' by Jayarami Reddy, P, Laxmi Publications Pvt. Ltd., (2013), New Delhi
3. 'Applied hydrology' by Chow V.T., D.R Maidment and L.W. Mays, Tata McGraw Hill Education Pvt. Ltd., (2011), New Delhi.

REFERENCES:

1. 'Water Resources Engineering', Mays L.W, Wiley India Pvt. Ltd, (2013).
2. 'Hydrology' by Raghunath. H.M., New Age International Publishers, (2010).
3. 'Engineering Hydrology –Principles and Practice' by Ponce V.M., Prentice Hall International, (1994).

Web Link

<https://nptel.ac.in/courses/105/104/105104103/>

DESIGN AND DRAWING OF STEEL STRUCTURES

Course Learning Objectives:

The objective of this course is to:

1. Familiarize Students with different types of Connections and relevant IS codes
2. Equip student with concepts of design of flexural members
3. Understand Design Concepts of tension and compression members in trusses
4. Familiarize students with different types of Columns and column bases and their Design
5. Familiarize students with Plate girder and Gantry Girder and their Design

Course Outcomes:

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

1. Work with relevant IS codes
2. Carryout analysis and design of flexural members and detailing
3. Design compression members of different types with connection detailing
4. Design Plate Girder and Gantry Girder with connection detailing
5. Produce the drawings pertaining to different components of steel structures

Syllabus:

UNIT – I Connections: Introduction: (a) Riveted connections – Definition, rivet strength and capacity- Codal Provisions, **(b) Welded connections:** Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints.

All units i.e. from unit II to unit-VI to be taught in Limit State Design and in Welded connections only.

UNIT – II Beams: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT –III Tension Members and compression members: General Design of members subjected to direct tension and bending –effective length of columns. Slenderness ratio – permissible stresses.

Design - Design of compression members, struts etc.

UNIT – IV Design of Columns: Built up compression members – Design of lacings and battens. Design Principles of Eccentrically loaded columns, Splicing of columns.

Design of Column Foundations: Design of slab base and gusseted base. Column bases subjected moment.

UNIT – V Design of Plate Girder: Design consideration – I S Code recommendations Design of plate girder-Welded – Curtailment of flange plates, stiffeners – splicing and connections.

Design of Gantry Girder: impact factors - longitudinal forces, Design of Gantry girders

Note: Welding connections should be used in Units II – V.

The students should prepare the following plates.

Plate 1 Detailing of welded joints.

Plate 2 Detailing of simple and Compound beams including curtailment of flange plates.

Plate 3 Detailing of compression and tension member

Plate 4 Detailing of Column including lacing, battens, Column bases – slab base and gusseted base

Plate 5 Detailing of Plate girder including curtailment, splicing and stiffeners.

Final Examination Pattern:

The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

Text Books:

1. Steel Structures Design and Practice, N. Subramanian, Oxford University Press.
2. Design of steel structures, S. K. Duggal, Tata McGraw Hill, New Delhi
3. Design of Steel Structures S. S. Bhavikatti, I. K International Publishing House Pvt. Ltd.

References:

1. Structural Design in Steel, SarwarAlamRaz, New Age International Publishers, New Delhi

2. Design of Steel Structures, M. Raghupathi, Tata Mc. Graw-Hill
3. Structural Design and Drawing, N. Krishna Raju; University Press

IS Codes:

- 1) Indian Standard Code for General Construction in Steel, 3rd revision, Indian Standards Institution, New Delhi, 2008.
- 2) IS – 875, Code of practice for design loads (other than earth quake) for buildings and structures (Part-1-Part 5), Bureau of Indian standards.
- 3) Steel Tables.

These codes and steel tables are permitted to use in the examinations.

Web link:

<https://nptel.ac.in/courses/105/105/105105162/>

ENVIRONMENTAL ENGINEERING –II

Course Learning Objectives:

The objective of this course is:

1. Outline planning and the design of wastewater collection, conveyance
2. and treatment systems for a community/town/city
3. Summarize the appurtenance in sewerage systems and their necessity
4. Teach planning, and design of septic tank and imhoff tank and the
5. disposal of the effluent from these low-cost treatment systems

Course Outcomes:

By the end of successful completion of this course, the students will be able to:

1. Plan and design the sewerage systems
2. Select the appropriate appurtenances in the sewerage systems
3. Identify the critical point of pollution in a river for a specific amount of
4. pollutant disposal into the river
5. Suggest a suitable disposal method with respect to effluent standards.

SYLLABUS:

UNIT – I: Introduction to Sanitation – Systems of sanitation – relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems- Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - Hydraulics of sewers and storm drains– design of sewers – appurtenances in sewerage – cleaning and ventilation of sewers.

UNIT – II: Pumping of wastewater: Pumping stations – location – components– types of pumps and their suitability with regard to wastewaters. **House Plumbing:** Systems of plumbing-sanitary fittings and other accessories– one pipe and two pipe systems – Design of building drainage.

UNIT – III: Sewage characteristics – Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations Treatment of sewage: Primary treatment-Screens-grit chambers-grease traps– floatation– sedimentation – design of preliminary and primary treatment units.

UNIT – IV: Secondary treatment: Aerobic and anaerobic treatment process comparison. **Suspended growth process:** Activated Sludge Process, principles, designs, and operational problems, modifications of Activated Sludge Processes, Oxidation ponds, Aerated Lagoons.

UNIT V: Miscellaneous Treatment Methods: Nitrification and Denitrification – Removal of Phosphates –UASB–Membrane reactors-Integrated fixed film reactors. Anaerobic Processes: Septic Tanks and Imhoff tanks- –Reuse and disposal of septic tank effluent.

Bio-solids (Sludge) management: Characteristics-SVI, handling and treatment of sludge-thickening – anaerobic digestion of sludge, Sludge Drying Beds, **Disposal of sewage:** Methods of disposal – disposal into water bodies- Oxygen Sag Curve-Disposal into sea, disposal on land- sewage sickness.

Text Books:

1. Wastewater Engineering Treatment and Reuse, Metcalf & Eddy, Tata McGraw-Hill edition.
2. Industrial Water and Wastewater Management, K.V.S.G. Murali Krishna.
3. Elements of Environmental Engineering, K. N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.

References:

1. Environmental Engineering, Howard S. Peavy, Donald R. Rowe, George George Tchobanoglus – McGraw-Hill Book Company, New Delhi, 1985
2. Wastewater Treatment for Pollution Control and Reuse, Soli. J Arceivala, Sham R Asolekar, McGrawHill, NewDelhi; 3rd Edition.

Web link:

<https://nptel.ac.in/courses/103/107/103107084/>

FUNDAMENTALS OF ENTREPRENEURSHIP

Course learning Objectives

The student should able

1. To understand Entrepreneurship and its role in the society.
2. To understand the Role of entrepreneurship in economic development
3. To gain knowledge about Growth of entrepreneurship in India
4. To understand the finding the gaps for new business and new way of business
5. To understand Entrepreneurship Development Programs

Course learning outcomes

1. The student shall be equipped with the required entrepreneurial knowledge and skill to start a business.
2. The student shall be motivated towards entrepreneurial process, innovative and lateral thinking.
3. The student will understand the characteristics of entrepreneur
4. The student will be able to know types of entrepreneurs, entrepreneurial culture and entrepreneurial process
5. The student will have sound knowledge of conducting entrepreneurship development program

Unit-I: Entrepreneur and Entrepreneurship – Description and definition of entrepreneur – Characteristics of entrepreneur – Functions of an entrepreneur – types of entrepreneurs – concept of entrepreneurship – entrepreneurial culture – entrepreneurial process – entrepreneurial competencies – entrepreneurial mobility.

Unit-II: Evolution of Entrepreneurship: Genesis of entrepreneur and entrepreneurship - Theories of Entrepreneurship – Role of entrepreneurship in economic development – Barriers of entrepreneurship - Entrepreneurship and current business environment

Unit-III: Entrepreneurial Mindset: Entrepreneurial Motives, Motivating factors of entrepreneurship - Growth of entrepreneurship in India –

Agriculture- Agricultural Entrepreneurship to Industry entrepreneurship to Services entrepreneurship – corporate entrepreneurship – women entrepreneurship.

Unit-IV: Business Idea generation: Sourcing of business ideas, innovative ideas, opportunity identification, scanning of the environment - finding the gaps for new business and new way of business - setting-up new ventures - acquiring existing business – franchising and Entrepreneurship.

Unit-V: Entrepreneurship Development Programmes: Need and objectives of EDP – Evolution of EDPs – Phases of EDPs – Course content and curriculum of EDPs – Management Education centers and Entrepreneurship Development Programmes.

Text Book

1. Donald F. Kuratko Entrepreneurship: Theory, Process, Practice New Delhi: Cengage Learning.
2. A Textbook on Entrepreneurship Development Programme by Dr. Muzafar Ahmad Bhat, Dr. Suraksha Chanotra
3. Entrepreneurship Development by K Ramachandran

References

1. Bill Bolton, John Thompson (2014), Entrepreneurs: Talent, Temperament and Opportunity, Routledge 3rd Ed.
2. Arya Kumar (2014), Entrepreneurship: Creating and Leading an Entrepreneurial Organization, New Delhi: Pearson Publications.
3. S.Anil Kumar & S.C Purnima (2014), Entrepreneurship Development, New Delhi: New Age Publishers.

Web Link:

1. <https://nptel.ac.in/courses/110/106/110106141/>

EARTHQUAKE ENGINEERING

A. Course Objective:

To provide a coherent development to the students for the courses in sector of earthquake

1. Engineering To present the foundations of many basic engineering concepts related earthquake
2. Engineering To give an experience in the implementation of engineering concepts which are applied in field of earthquake engineering.
3. To involve the application of scientific and technological principles of planning, analysis,
4. Design of buildings according to earthquake design philosophy.
5. Analysis of structure by various methods.

B. Course Outcomes:

1. The students will gain an experience in the implementation of Earthquake Engineering on engineering concepts which are applied in field Structural Engineering.
2. The students will get a diverse knowledge of earthquake engineering practices applied to real life problems
3. The students will learn to understand the theoretical and practical aspects of earthquake engineering along with the planning and design aspects.
4. The students will learn Analysis, Designing and Detailing Structure Considering Earthquake Loads.
5. The students will learn to understand the Classroom participation and involvement in solving the problems.

UNIT-I:

Introduction to Dynamic Loads Static Load v/s Dynamic Load, Types of Dynamic forces, Force Control and Displacement Control

UNIT-II:

Basics of Seismology Earth and its interior, Plate Tectonics, Convection Currents, The Earth quake, Inter Plate Earthquake (Convergent Boundaries, Divergent Boundaries and Transform Boundaries), Intra Plate Earthquake (Faults and Types of Faults), Seismic Waves, Basic Terminology, Measuring Units and Instruments

UNIT-III:

Behavior of Structures During Earthquake and Earthquake Resistant Features of Structure a) Inertia forces in structures b) Behavior of Brick Masonry Structures: Behavior of Brick Masonry Walls, Box Action, Different types of Bands c) Behavior of Stone Masonry Structures: Behavior of Stone Masonry Walls, Earthquake Resistant Features of Stone Masonry Structures

UNIT IV:

Fundamentals of Earthquake Vibrations of Structures Equation of Motion (By Newton's Law and By D'Alembert's Principle), Degrees of Freedom, Simplified Single Degree of Freedom, Mathematical Modeling, Equation of Motion for Free Vibration for Damped and Un damped System (Single Degree of Freedom System), Equation of Motion for Forced Vibration for Damped and Un damped System (Single Degree of Freedom System), Logarithmic Decrement

UNIT V:

Earthquake Load Analysis on Structures Introduction to methods of Earthquake Load Analysis (Linear Static, Linear Dynamic, Non-Linear Static, Non-Linear Dynamic) Analysis of Structure by Linear Static Method (Seismic Coefficient Method) Analysis of Structure by Linear Dynamic Method (Random Response Method)

TextBooks :

1. Earthquake Resistant Design of Structures By Pankaj Agarwal & Manish Shrikhande, PHI Publications
2. Manish Shrikhande & Pankaj Agrawal; Earthquake Resistant Design of Structures, PHI Publication, New Delhi
3. S. K. Duggal; Earthquake Resistance Design of Structures; Oxford University Press, New Delhi

Reference Books :

1. A. K. Chopra; Dynamics of Structures, Pearson, New Delhi
2. IITK-bmtpc, Earthquake Tips "Learning Earthquake Design and Construction" by C.V.R.Murthy, Building Material and Technology Promotion Council

Web Link:

1. <https://nptel.ac.in/courses/145/106/110506141/>

SOLID & HAZARDOUS WASTE MANAGEMENT

Course Learning Objectives:

The objective of this course is:

1. To impart the knowledge the methods of collection and optimization of collection routing of municipal solid waste.
2. To acquire the principles of treatment of municipal solid waste
3. To know the impact of solid waste on the health of the living beings
4. To learn the criterion for selection of landfill and its design
5. To plan the methods of processing such as composting the municipal organic waste.

Course Learning Outcomes:

Upon successful completion of this course, the students will be able to:

1. Design the collection systems of solid waste of a town
2. Design treatment of municipal solid waste and landfill
3. To know the criteria for selection of landfill
4. To characterise the solid waste and design a composting facility
5. Processing and composting the municipal organic waste.

SYLLABUS:

UNIT- I

Introduction to Solid Waste Management: Goals and objectives of solid waste management, Classification of Solid Waste - Factors Influencing generation of solid waste - sampling and characterization –Future changes in waste composition, major legislation, monitoring responsibilities.

UNIT- II

Basic Elements In Solid Waste Management: Elements and their inter relationship – principles of solid waste management- onsite handling, storage and processing of solid waste

Collection of Solid Waste: Type and methods of waste collection systems, analysis of collection system - optimization of collection routes– alternative techniques for collection system.

UNIT- III

Transfer and Transport: Need for transfer operation, compaction of solid waste - transport means and methods, transfer station types and design requirements.

UNIT- IV

Separation and Transformation of Solid Waste:unit operations used for separation and transformation: shredding - materials separation and recovery, source reduction and waste minimization.

UNIT- V

Processing and Treatment: Processing of solid waste - Waste transformation through combustion and composting, anaerobic methods for materials recovery and treatment – Energy recovery – biogas generation and cleaning– Incinerators.

TEXT BOOKS

1. George Tchobanoglous “Integrated Solid Waste Management”, McGraw Hill Publication, 1993
2. Charles A. Wentz; “Hazardous Waste Management”, McGraw Hill Publication, 1995.

REFERENCES

1. Vesilind, P.A., Worrell, W., Reinhart, D. “Solid Waste Engineering”, Cengage learning, New Delhi, 2004

Web Link

<https://nptel.ac.in/courses/105/106/105106056/>

GREEN BUILDINGS AND TECHNOLOGY

Course Learning Objectives:

The objective of this course is:

1. To introduce Green Building provisions
2. To introduce various equipments of Green technology
3. To introduce the importance of safety in construction projects
4. Methods of production of aggregate products and concreting
5. Usage of machinery required for the works

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Appreciate the importance Green Building provisions
2. Understand the various equipments of Green technology
3. Know the methods of importance of safety in construction projects
4. Apply the gained knowledge to pollution prevention programme
5. Understand the machinery required for the works

Syllabus:

Unit- I

Green Buildings Provisions and Miscellaneous Services : Rain water Harvesting for buildings- Concept of GREEN buildings -Components of GREEN building -Introduction and Significance to Grey water- Components of Grey water system -Management of Grey water system

UNIT- II

Introduction: Green Technology – definition- Importance – Historical evolution – advantages and disadvantages of green technologies-factors affecting green technologies- Role of Industry, Government and Institutions – Industrial Ecology – role of industrial ecology in green technology.

Cleaner Production (CP): Definition – Importance – Historical evolution - Principles of Cleaner Production–Benefits–Promotion–Barriers – Role of Industry

UNIT- III

Cleaner Production Project Development and Implementation:

Government and Institutions – clean development mechanism, reuse, recovery, recycle, raw material substitution-Wealth from waste, case studies.

Overview of CP Assessment Steps and Skills, Process Flow Diagram, Material Balance, CP Option Generation – Technical and Environmental Feasibility analysis – Economic valuation of alternatives - Total Cost Analysis – CP Financing – Preparing a Program Plan – Measuring Progress- ISO 14000.

UNIT- IV

Pollution Prevention and Cleaner Production Awareness Plan – Waste audit – Environmental Statement, carbon credit, carbon sequestration, carbon trading, Life Cycle Assessment - Elements of LCA – Life Cycle Costing – Eco Labelling.

UNIT -V

Availability and need of conventional energy resources, major environmental problems related to the conventional energy resources, future possibilities of energy need and availability. Non-conventional energy sources: Solar Energy-solar energy conversion technologies and devices, their principles, working and application.

TEXT BOOKS:

1. 'Pollution Prevention: Fundamentals and Practice' by Paul L Bishop (2000), McGraw Hill International.
2. 'Cleaner Production Audit' by Prasad Modak, C.Visvanathan and Mandar Parasnis (1995), Environmental System Reviews, No.38, Asian Institute of Technology, Bangkok
3. 'Non-conventional Energy Sources' by Rai G.D.

REFERENCES:

1. 'Pollution Prevention and Abatement Handbook – Towards Cleaner Production' by World Bank Group (1998), World Bank and UNEP, Washington D.C.
2. 'Handbook of Organic Waste Conversion' by Bewik M.W.M.
3. 'Energy, The Solar Hydrogen Alternative' by Bokris J.O.

Web Link:

<https://nptel.ac.in/courses/105/102/105102195/>

ENVIRONMENTAL POLLUTION CONTROL

Course Learning Objectives:

1. Impart knowledge on fundamental aspects of air pollution & control, noise pollution, and solid waste management.
2. Provide basic knowledge on sustainable development.
3. Introduces some basics of sanitation methods essential for protection of community health.
4. Differentiate the solid and hazardous waste based on characterization
5. Identify the air pollutant control devices

Course Learning Outcomes:

By the end of successful completion of this course, the students will be able to:

1. Have knowledge on the NAAQ standards and air emission standards
2. Differentiate the treatment techniques used for sewage and industrial wastewater treatment methods.
3. Understand the fundamentals of solid waste management, practices adopted in his town/village and its importance in keeping the health of the city.
4. Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics.
5. Appreciate the importance of sustainable development while planning a project or executing an activity.

SYLLABUS

UNIT – I : Air Pollution: Air pollution Control Methods–Particulate control devices – Methods of Controlling Gaseous Emissions – Air quality standards. Noise Pollution: Noise standards, Measurement and control methods – Reducing residential and industrial noise – ISO14000.

UNIT –II : Industrial wastewater Management:– Strategies for pollution control – Volume and Strength reduction – Neutralization – Equalization – Proportioning – Common Effluent Treatment Plants – Recirculation of industrial wastes – Effluent standards.

UNIT – III : Solid Waste Management: solid waste characteristics – basics of on-site handling and collection – separation and processing – Incineration- Composting-Solid waste disposal methods – fundamentals of Land filling.

UNIT – IV : Environmental Sanitation: Environmental Sanitation Methods for Hostels and Hotels, Hospitals, Swimming pools and public bathing places, social gatherings (melas and fares), Schools and Institutions, Rural Sanitation-low cost waste disposal methods.

UNIT – V: Hazardous Waste: Characterization – Nuclear waste – Biomedical wastes – Electronic wastes – Chemical wastes – Treatment and management of hazardous waste-Disposal and Control methods.

TEXT BOOKS

1. Environmental Engineering, by Ruth F. Weiner and Robin Matthews – 4th Edition Elsevier, 2003.
2. Environmental Science and Engineering by J.G. Henry and G.W. Heinke – Pearson Education.
3. Environmental Engineering by Mackenzie L Davis & David A Cornwell. McGraw Hill Publishing.

References:

1. Air Pollution Control by W. Wesley Eckenfelder, Mc- GrawHill, Third Edition
2. The Facility Manager's Guide to Environmental Health and Safety by Brian Gallant, GovernmentInst Publ., 2007.
3. Effective Environmental, Health, and Safety Management Using the Team Approach by BillTaylor, Culinary and Hospitality Industry Publications Services 2005.

Web Link:

<https://nptel.ac.in/courses/105/102/105102089/>

OFF SHORE STRUCTURES

Course learning objectives

The student should

1. Acquire knowledge about the analytical models for offshore structure skills to carry out basic tasks regarding dimensioning and structural design of offshore structures.
2. be able to calculate maximum base shear and overturning moments for structure and Estimation of maximum forces on an offshore structure due to operational
3. 3.Know the Possible modes of failure, Eccentric connections and offset connections, Cylindrical and rectangular structural members
4. Understand the behavior of steel at elevated temperature
5. Know the preventive measures of corrosion

Course learning outcomes

1. Acquire training in the design of jacket platforms, tubular joints and concrete gravity platforms. CO4. Estimate the resistance of platforms against fatigue and accidental loads.
2. Attain knowledge in the physics of corrosion and methods to monitor and prevent corrosion.
3. Provide the candidate with the knowledge and skills to carry out basic tasks regarding structural design and dimensioning of marine structures.
4. sound knowledge on serviceability and safety design criteria, including requirements to overall stability and strength as well as evacuation and escape.
5. should understand the design rules for offshore structures including offshore wind turbines. Overview of functional, environmental and accidental loads for marine structures

Syllabus

Unit-1 Types of offshore structures and their conceptual development- Fixed, Compliant, Floating- Analytical models for offshore structures- Behaviour under static and dynamic loads- Materials and construction of jacket and gravity platforms- Statutory regulations- Allowable stresses- Design methods and Code Provisions- Design specification of API, DNV, Lloyd's and other Classification Societies.

Unit-2 Environmental loads- Wind, wave, current and ice loads- Calculation based on maximum base shear and overturning moments- Design wave height and spectral definition- Morison's Equation-

Maximum wave force on offshore structure- Concept of return waves- Principles of static and dynamic analyses of fixed platforms-Use of approximate methods

Unit- 3 Introduction to tubular members- Slenderness effect- Column buckling-Tubular joints- Possible modes of failure, Eccentric connections and offset connections.

Cylindrical and rectangular structural members- Inplane and multi plane connections- Parameters of inplane tubular joints- Kuang's formulae- Elastic stress distribution- Punching shear stress.

Unit-4 Design concepts against accidental loads- Fire, Blast and Collision- Behaviour of steel at elevated temperature-Fire rating for Hydrocarbon fire- Design of structures for high temperature- Blast mitigation-Blast walls- Collision of boats and energy absorption.

Unit-5 Corrosion- Corrosion mechanism- Types of corrosion- Offshore structure corrosion zones- Biological corrosion- Preventive measures of corrosion- Principles of cathode protection systems- Sacrificial anode method and impressed current method- Online corrosion monitoring- Corrosion fatigue.

Textbook:

1. Offshore Structures: Design, Construction and Maintenance Hardcover – 21 August 2012
by Mohamed A. El-Reedy
2. DNV-RP-C204- Design Against Accidental Loads, 2010.

References:

1. SrinivasanChandrasekaran, Dynamic Analysis and Design of Ocean Structures.Springer, 2015.
2. DNV-RP-C203- fatigue Design of Offshore Steel Structures, 2011.

Web link:

<https://nptel.ac.in/courses/114/106/114106011>

GROUNDWATER DEVELOPMENT

Course Learning Objectives:

The course is designed to

1. Appreciate groundwater as an important natural resource.
2. Understand flow towards wells in confined and unconfined aquifers.
3. Understand the principles involved in design and construction of wells.
4. Know the importance of saline water intrusion in coastal aquifers and its control measures.
5. Appreciate various geophysical approaches for groundwater exploration.

Course Outcomes

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

1. Estimate aquifer parameters and yield of wells.
2. Analyse radial flow towards wells in confined and unconfined aquifers.
3. Design wells and understand the construction practices.
4. Interpret geophysical exploration data for scientific source finding of aquifers.
5. Determine the process of artificial recharge for increasing groundwater potential.

SYLLABUS:

UNIT – I

Introduction

Groundwater in the hydrologic cycle, groundwater occurrence, aquifer parameters and their determination, general groundwater flow equation.

Well Hydraulics

Steady radial flow and unsteady radial flow to a well in confined and unconfined aquifers, Theis solution, Jacob and Chow's methods, Leaky aquifers.

UNIT – II

Well Design

Water well design-well diameter, well depth, well screen-screen length, slot size, screen diameter and screen selection, design of collector wells, infiltration gallery.

UNIT III

Well Construction and Development

Water wells, drilling methods-rotary drilling, percussion drilling, well construction-installation of well screens-pull-back method, open- hole, bail- down and wash-down methods, well development-mechanical surging using compressed air, high velocity jetting of water, over pumping and back washing, well completion, well disinfection, well maintenance.

UNIT IV

Artificial Recharge

Concept of artificial recharge of groundwater, recharge methods-basin, stream-channel, ditch and furrow, flooding and recharge well methods, recharge mounds and induced recharge.

Saline Water Intrusion

Occurrence of saline water intrusion, Ghyben- Herzberg relation, Shape of interface, control of saline water intrusion.

UNIT – V

Geophysics

Surface methods of exploration of groundwater – Electrical resistivity and Seismic refraction methods, Sub-surface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications.

Basic principles of groundwater modelling- Analog models-viscous fluid models and membrane models, digital models-Finite difference and finite element models, Concepts of groundwater management, basin management by conjunctive use-case studies.

TEXT BOOKS:

1. 'Groundwater' by Raghunath H M, New Age International Publishers, 2005.
2. 'Groundwater Hydrology' by Todd D.K., Wiley India Pvt Ltd., 2014.
3. 'Groundwater Hydrology' by Todd D K and L W Mays, CBS Publications, 2005.

REFERENCES:

1. 'Groundwater Assessment and Management' by Karanth K R, Tata McGraw Hill Publishing Co., 1987.
2. 'Groundwater Hydrology' by Bouwer H, McGraw Hill Book Company, 1978.
3. 'Groundwater Systems Planning and Management' by Willis R and

Web Link

<https://nptel.ac.in/courses/105/103/105103026/>

ENVIRONMENTAL ENGINEERING LAB

Course Learning Objectives:

The course will address the following:

1. Estimation of some important characteristics of water and wastewater in the laboratory.
2. It also gives the significance of the characteristics of the water and wastewater.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Estimation of some important characteristics of water and wastewater in the laboratory.
2. Decide whether the water body is polluted or not with reference to the state parameters in the list of experiments.
3. Estimation of the strength of these sewage in terms of BOD and COD.

SYLLABUS:

List of Experiments

1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil.
2. Determination and estimation of Total Hardness – Calcium & Magnesium.
3. Determination of Alkalinity/Acidity
4. Determination of Chlorides in water and soil.
5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone.
6. Determination of Iron.
7. Determination of Dissolved Oxygen with D.O. Meter & Winkler's Method and B.O.D.
8. Determination of N, P, K values in solid waste
9. Physical parameters – Temperature, Colour, Odour, Turbidity, Taste.
10. Determination of C.O.D.
11. Determination of Optimum coagulant dose.
12. Determination of Chlorine demand.
13. Presumptive Coliform test.

NOTE: At least 10 of the above experiments are to be conducted.

List of Equipments

- 1) pH meter
- 2) Turbidity meter
- 3) Conductivity meter
- 4) Hot air oven
- 5) Muffle furnace

- 6) DissolvedOxygenmeter
- 7) U–Vvisible spectrophotometer
- 8) CODRefluxApparatus
- 9) JarTestApparatus
- 10) BODincubator
- 11) Autoclave
- 12) Laminarflowchamber
- 13) Hazen’sApparatus

TextBooks

1. StandardMethodsforAnalysisofWaterandWasteWater–APHA.
2. ChemicalAnalysisofWaterandSoilbyKVSGMuraliKrishna,ReemPublications, NewDelhi.

Reference

1. RelevantISCodes.
2. ChemistryforEnvironmentalEngineeringbySawyerandMc.Carty.

GEOTECHNICAL ENGINEERING LAB

Course Learning Objectives:

The objective of this course is:

1. To impart knowledge of determination of index properties required for classification
2. To know the Grain size analysis by sieving of soils.
3. To teach how to determine compaction characteristics and consolidation behavior
4. From relevant lab tests; to determine permeability of soils.
5. To teach how to determine shear parameters of soil through different laboratory tests.

Course Outcomes:

Upon successful completion of this course, student will be able to

1. Determine index properties of soil and classify them.
2. Determine permeability of soils.
3. Determine Compaction, Consolidation and shear strength characteristics.
4. Determine shear for soil sample
5. Determine CBR of soil sample

Syllabus:

List of Experiments

1. Specific gravity, G
2. Atterberg's Limits.
3. Field density-Core cutter and Sand replacement methods
4. Grain size analysis by sieving
5. Hydrometer Analysis Test
6. Permeability of soil - Constant and Variable head tests
7. Compaction test
8. Consolidation test (to be demonstrated)
9. Direct Shear test
10. Tri-axial Compression test (UU Test)
11. Unconfined Compression test
12. Vane Shear test
13. Differential free swells (DFS)
14. CBR Test

At least ten experiments shall be conducted.

References

1. Soil mechanics and foundation engineering by K.R Arora
2. Geotechnical Engineering (22404) (paperback, Dr. dinesh kumar gupta, vaibhao k. sonarkar, dr. sikander a. rasal)
3. Soil Mechanics and Foundations by B.C. Punmi, Ashok Kumar Jain , Arun Kumar Jain



DEPARTMENT OF CIVIL ENGINEERING
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VIZIANAGARAM-535003, ANDHRA PRADESH, INDIA.

B.Tech COURSE STRUCTURE (2019 Admitted batch)

IV B.Tech. – I Semester

S. No.	Code	Course	POs	L	T	P	Credits
1	PC	GEOTECHNICAL ENGINEERING -II		3	0	0	3
2	PC	WATER RESOURCE ENGINEERING -II		3	0	0	3
3	PC	ESTIMATION COSTING & SPECIFICATIONS		3	0	0	3
5	OE	OPEN ELECTIVE -II <ul style="list-style-type: none">• DISASTER MANAGEMENT• TRANSPORTATION ENGINEERING -II• BRIDGE ENGINEERING		3	0	0	3
6	PE	ELECTIVE -III <ul style="list-style-type: none">• PRESTRESSED CONCRETE• PAVEMENT ANALYSIS & DESIGN• INDUSTRIAL WATER AND WASTE WATER MANAGEMENT• ENVIRONMENTAL IMPACT ASSESSMENT		3	0	0	3
7	PC	PROJECT WORK -I		0	0	0	2
		LABS					
8	PC	CASE LAB		0	0	3	1.5
		TOTAL CREDITS					18.5

GEOTECHNICAL ENGINEERING – II

Course Learning Objectives:

The objective of this course is:

1. To impart to the student knowledge of slopes and retaining structures
2. To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.
3. To enable the student to compute immediate and consolidation settlements of shallow foundations.
4. To impart the principles of important field tests such as SPT and Plate bearing test.
5. To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.

Course Outcomes:

Upon the successful completion of this course:

1. The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
2. The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.
3. The student must be able to use the field test data and arrive at the bearing capacity.
4. The student must be able to design Piles based on the principles of bearing capacity.
5. To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.

SYLLABUS:

UNIT – I Stability of Slopes: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices – Taylor’s Stability Number-Stability of slopes of dams and embankments - different conditions.

UNIT – II Earth Retaining Structures: Rankine’s & Coulomb’s theory of earth pressure – Culmann’s graphical method - earth pressures in layered soils.

UNIT-III Shallow Foundations – Bearing Capacity Criteria: Types of foundations and factors to be considered in their location - Bearing capacity – criteria for determination of

bearing capacity – factors influencing bearing capacity – analytical methods to determine bearing capacity – Terzaghi's theory - IS Methods. Settlement Criteria:

Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination – allowable settlements of structures.

UNIT –IV Pile Foundations: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays.

UNIT-V Well Foundations: Types – Different shapes of well – Components of well – functions – forces acting on well foundations - Design Criteria – Determination of steining thickness and plug - construction and Sinking of wells – Tilt and shift.

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

Text Books:

1. Principles of Foundation Engineering, Das, B.M., (2011), 6th edition Cengage learning
2. Basic and Applied Soil Mechanics, Gopal Ranjan & A.S.R. Rao, New Age International Pvt. Ltd, (2004).

References:

1. Foundation Analysis and Design, Bowles, J.E., (1988), 4th Edition, McGraw-Hill Publishing Company, Newyork.
2. Analysis and Design of Substructures by Swami Saran, Sarita Prakashan, Meerut.

Web link

<https://nptel.ac.in/courses/105/105/105105185/>

WATER RESOURCES ENGINEERING–II

Course Learning Objectives:

The course is designed to

1. Introduce the types of irrigation systems
2. Introduce the concepts of planning and design of irrigation systems
3. Discuss the relationships between soil, water and plant and their significance in planning an irrigation system.
4. Understand design methods of erodible and non-erodible canals
5. Know the principles of design of hydraulic structures on permeable foundations.

Course Outcomes:

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

1. Estimate irrigation water requirements
2. Design irrigation canals and canal network
3. Design irrigation canal structures
4. Plan and design diversion head works
5. Analyse stability of gravity and earth dams

SYLLABUS:

UNIT-I

Irrigation: Necessity and importance, principal crops and crop seasons, types, methods of application, soil-water-plant relationship, soil moisture constants, consumptive use, estimation of consumptive use, crop water requirement, duty and delta, factors affecting duty, depth and frequency of irrigation, irrigation efficiencies, water logging and drainage, standards of quality for irrigation water, crop rotation.

UNIT-II

Canals: Classification, design of non-erodible canals - methods of economic section and maximum permissible velocity, economics of canal lining, design of erodible canals -Kennedy's silt theory and Lacey's regime theory, balancing depth of cutting.

UNIT III

Canal Structures:

Falls: Types and location, design principles of Sarda type fall and straight glacis fall.

Regulators: Head and cross regulators, design principles

Cross Drainage Works:

Types, selection, design principles of aqueduct, siphon aqueduct and super passage.

Outlets: types, proportionality, sensitivity and flexibility

River Training: Objectives and approaches

UNIT-IV

Diversion Head Works: Types of diversion head works, weirs and barrages, layout of diversion head works, components. causes and failures of weirs on permeable foundations, Bligh's creep theory, Khosla's theory, design of impervious floors for subsurface flow, exit gradient.

UNIT-V

Reservoir Planning: Investigations, site selection, zones of storage, yield and storage capacity of reservoir, reservoir sedimentation.

Dams: Types of dams, selection of type of dam, selection of site for a dam. 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 dam, stability analysis, drainage galleries, grouting.

Spillways: Types, design principles of Ogee spillways, types of spillways crest gates. Energy dissipation below spillways-stilling basin and its appurtenances.

TEXT BOOKS:

1. 'Irrigation and Water Power Engineering' by Punmia B C, P.B.B Lal, A.K. Jain and A.K. Jain (2009), Laxmi Publications Pvt. Ltd., New Delhi.
2. 'Irrigation and Water Resources Engineering' by Asawa G L (2013), New Age International Publishers.
3. 'Irrigation Engineering' by Raghunath H.M (2012), Wiley India.

REFERENCES:

1. 'Water Resources Engineering' by Mays L.W (2013), Wiley India Pvt. Ltd, New Delhi.
2. 'Irrigation Engineering' by Sharma R.K. and Sharma, T.K (2012), S.Chand & Co Publishers.
3. 'Water Resources Engineering' by Satyanarayana Murthy Challa (2008), New Age International Publishers

Web Link

<https://nptel.ac.in/courses/105/104/105104103/>

ESTIMATION COSTING & SPECIFICATIONS

Course Learning Objectives:

The objective of this course is to enable the students to:

1. Understand the quantity calculations of different components of the buildings.
2. Understand the rate analysis of different quantities of the buildings components.
3. Learn various specifications and components of the buildings.
4. Estimate the quantity of given plan by using long and short wall method
5. Estimate the quantity of given plan by using center line method method

Course Outcomes:

Upon the successful completion of this course:

1. The student should be able to determine the quantities of different components of buildings.
2. The student should be in a position to find the cost of various building components.
3. The student should be capable of finalizing the value of structures.
4. The student will be able to do estimates of the building for given plan
5. The student could be in a position to study the plans for estimates

SYLLABUS:

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

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

Unit-III Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules.

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings
Standard specifications for different items of building construction.

Unit – IV Detailed Estimation of Buildings using individual wall method

Unit-V Detailed Estimation of Buildings using center line method.

Final Examination Pattern:

The end examination paper should consist of SIX questions from Unit 1 to Unit 3, out of which THREE are to be answered (60% weight-age) & ONE mandatory question (40% weight-age) from Units 4 & 5 is to be answered.

Text Books:

1. Estimating and Costing, B.N. Dutta, UBS publishers, 2000.
2. Civil Engineering Contracts and Estimates, B. S. Patil, Universities Press (India) Pvt. Ltd., Hyd.
3. Construction Planning and Technology, Rajiv Gupta, CBS Publishers & Distributors Pvt. Ltd. New Delhi.

References:

1. Standard Schedule of rates and standard data book, Public works department.
2. IS 1200 (Parts I to XXV-1974/ Method of Measurement of Building & Civil Engg Works – B.I.S.
3. Estimation, Costing and Specifications, M. Chakraborti; Laxmi publications.

Web Link:

1. <https://nptel.ac.in/courses/105/103/105103093/>

DISASTER MANAGEMENT

Course Learning Objectives:

The objective of these courses:

1. Develop an understanding of why and how the modern disaster manager is involved with pre- disaster and post-disaster activities.
2. Develop an awareness of the chronological phases of natural disaster response and refugee relief operations. Understand how the phases of each are parallel and how they differ.
3. Understand the 'relief system' and the 'disaster victim.'
4. Describe the three planning strategies useful in mitigation.
5. Identify the regulatory controls used in hazard management.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Affirm the usefulness of integrating management principles in disaster mitigation work
2. Distinguish between the different approaches needed to manage pre- during and post- disaster periods
3. Explain the process of risk management
4. Relate to risk transfer
5. Understand the tools of post-disaster management.

SYLLABUS:

UNIT-I

Natural Hazards and Disaster Management: Introduction of DM – Inter disciplinary nature of the subject– Disaster Management cycle – Five priorities for action. Case study methods of the following: Vegetal Cover floods, droughts – Earthquakes – landslides – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast.

UNIT-II

Man Made Disaster and Their Management Along With Case Study Methods Of The Following:

Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrorism - threat in mega cities, rail and aircraft accidents, ground water, industries - Emerging infectious diseases and Aids and their management.

UNIT-III

Risk and Vulnerability: Building codes and land use planning – Social Vulnerability – Environmental vulnerability – Macro-economic management and sustainable development, Climate change risk rendition – Financial management of disaster – related losses.

UNIT-IV

Role of Technology in Disaster Managements: Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations- roads and bridges-mitigation programme for earth quakes – flowchart, geospatial information in agriculture drought assessment - Multimedia Technology in disaster risk management and training - Transformable Indigenous Knowledge in disaster reduction – Role of RS & GIS.

UNIT-V

Multi-sectional Issues, Education and Community Preparedness: Impact of disaster on poverty and deprivation - Climate change adaptation and human health - Exposure, health hazards and environmental risk-Forest management and disaster risk reduction -The Red cross and red crescent movement - Corporate sector and disaster risk reduction- Education in disaster risk reduction- Essentials of school disaster education - Community capacity and disaster resilience-Community based disaster recovery - Community based disaster management and social capital-Designing resilience- building community capacity for action.

TEXT BOOKS:

1. An Introduction of Disaster Management- Natural Disasters & Vulnerable Hazards– S.Vaidyanathan: CBS Punblishers& Distributors Pvt.Ltd.
2. Natural Hazards & Disaster Management, Vulnerability and Mitigation by RB Singh- Rawat Publications
3. ‘Disaster Science & Management’ by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., NewDelhi.

REFERENCE BOOKS:

1. ‘Disaster Management’ edited by H K Gupta (2003), Universitiespress.
2. ‘Disaster Management – Global Challenges and Local Solutions’ by Rajib shah & R R Krishnamurthy (2009), Universitiespress.

3. R. Nishith , Singh AK, “ Disaster Management in India : Perspectives, Issues and strategies”
New Royal BookCompany.”

Web Link:

<https://nptel.ac.in/courses/105/104/105104183/>

TRANSPORTATION ENGINEERING – II

Course Learning Objectives:

The objective of this course is:

1. To know various components and their functions in a railway track
2. To acquire design principles of geometrics in a railway track.
3. To know various techniques for the effective movement of trains.
4. To acquire design principles of airport geometrics and pavements.
5. To know the planning, construction and maintenance of Docks and Harbours.

Course Outcomes:

At the end of course, Student can

1. Design geometrics in a railway track.
2. Provide good transportation network
3. Analyzing various techniques for the effective movement of trains
4. Design airport geometrics and airfield pavements.
5. Plan, construct and maintain Docks and Harbours.

SYLLABUS:

A.RAILWAY ENGINEERING

UNIT – I

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

UNIT – II

Geometric Design of Railway Track:Alignment – Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – safe speed on curves.

UNIT – III

Turnouts & Controllers:Track layouts – Switches – Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – Mechanical signalling system – Electrical signalling system – System for Controlling Train Movement – Interlocking – Modern signalling Installations.

B.AIRPORT ENGINEERING

UNIT – IV

Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics – Zoning laws – Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

C.DOCKS & HARBOUR

UNIT – V

Planning, Layout, Construction & Maintenance Of Docks & Harbours: Classification of ports – Requirement of a good port – classification of Harbours – Docks - Dry & wet docks – Transition sheds and workhouses – Layouts; Quays – construction of Quay walls – Wharves – Jetties – Tides - Tidal data and Analysis – Break waters – Dredging – Maintenance of Ports and Harbours – Navigational aids.

TEXT BOOKS:

1. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi
2. Airport Engineering by Khanna & Arora - Nemchand Bros, New Delhi.
3. Docks and Harbour Engineering by Bindra S.P. - Dhanpathi Rai & Sons, New Delhi.

REFERENCES:

1. 'Railway Engineering' by Saxena & Arora - Dhanpat Rai, New Delhi.
2. 'Transportation Engineering Planning Design' by Wright P.H. & Ashfort N.J. - John Wiley & Sons.
3. 'Airport Engineering' by Virendra Kumar, Dhanpat Rai Publishers, New Delhi.

Web Link

<https://nptel.ac.in/courses/105/107/105107123/>

BRIDGE ENGINEERING

Course Learning Objectives:

The objective of this courses:

1. Familiarize Students with different types of Bridges and IRC standards
2. Equip student with concepts and design of Slab Bridges, T Beam Bridges, Box Culverts
3. Understand concepts of design of Plate Girder Bridges
4. Familiarize with different methods of inspection of bridges and maintenance
5. Understand types of bridges

Course Outcomes:

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

1. Explain different types of Bridges with diagrams and Loading standards
2. Carryout analysis and design of Slab bridges, T Beam bridges, Box culvers and suggest structural detailing
3. Carryout analysis and design of Plate girder bridges
4. Organize for attending inspections and maintenance of bridges and prepare reports.
5. Analyze types of bridges

SYLLABUS:

UNIT-I Introduction- Bridges- Types- Slab bridges, T Beam, Arch bridges, Cable Stayed bridges, prestressed concrete bridges, Truss Bridges, Culverts, - Nomenclature- Selection of Bridge Site- Economical span- Abutments pier and end connections- types of foundations- Open, Pile, Well Foundations, Bearings – Types- Introduction to Loading standards- Railway and IRC Loading

UNIT-II Slab bridges- Wheel load on slab- effective width method- slabs supported on two edges- cantilever slabs- dispersion length- Design of interior panel of slab- Guyon's – Massonet Method – Hendry- Jaegar Methods- Courbon's theory- Pigeaud's method

UNIT-III T-Beam bridges- Analysis and design of various elements of bridge –Design of deck slab, Longitudinal girders, Secondary beams- Reinforcement detailing

UNIT-IV Plate Girder Bridges: Elements of plate girder and their design-web- flange- intermediate stiffener- vertical stiffeners- bearing stiffener- Splices, Design problem with detailing

UNIT-V Box Culverts: Loading – Analysis and Design- Reinforcement detailing.

Text Book

1. Essentials of Bridge Engineering, Jhonson VictorD
2. Design of Bridge Structures, T. R. Jagadeesh, M.A. Jayaram, PHI
3. Design of Bridges, N. Krishna Raju, Tata McGrawHill

References:

1. Design of Concrete Bridges, Aswini, Vazirani, Ratwani
2. Design of Steel Structures, B. C. Punmai, Jain & Jain, Lakshmi Publications
3. Bridge Engineering, S Ponuswamy

Web Link:

<https://nptel.ac.in/courses/105/105/1051>

PRESTRESSED CONCRETE

Course Learning Objectives:

The objective of this courses:

1. Familiarize Students with concepts of prestressing
2. Equip student with different systems and devices used in prestressing
3. Understand the different losses of prestress including short and long term losses
4. Familiarize students with the analysis and design of prestressed concrete members under flexure, shear and torsion
5. Understand concepts of stress transfer

Course Outcomes:

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

1. Understand the different methods of prestressing
2. Estimate effective prestress including the short and long term losses
3. Analyze and design prestressed concrete beams under flexure and shear
4. Understand the relevant IS Codal provisions for prestressed concrete
5. Analyze & Understand concepts of stress transfer

SYLLABUS:

UNIT-I Basic concepts of Prestressing- Advantages and Applications of Prestressed Concretes, High Strength Concrete- Permissible Stresses, Shrinkage, Creep, Deformation Characteristics, High strength Steel- Types, Strength- Permissible Stresses- Relaxation of Stress, Cover Requirements.

UNIT-II Prestressing Systems- Introduction, Tensioning devices, Pre-tensioning Systems, Post tensioning Systems, Basic Assumptions in Analysis of prestress and design, Analysis of prestress, Resultant Stresses at a section- pressure line- Concepts of load balancing- Stresses in Tendons, Cracking moment.

UNIT-III Losses of Pre-stressing- Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes -Elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation stress in steel, slip in anchorage, differential shrinkage- bending of members and frictional losses- Total losses allowed for design.

UNIT-IV Design for Flexural resistance- Types of flexural failure – Code procedures- Design of sections for flexure- Control of deflections- Factors influencing Deflection- Prediction of short term and long term deflections.

UNIT-V Design for Shear and Torsion- Shear and Principal Stresses- Design of Shear reinforcements- Codal Provisions- Design for Torsion, Design for Combined bending, shear and torsion.

Text Books

1. Prestressed Concrete, N. Krishna Raju, Tata McGrawhill
2. Prestressed Concrete, S.Ramamrutham
3. Prestressed Concrete Design , M.K. Hurst

References:

2. Prestressed Concrete, P.Dayaratnam
3. Design of Pre stressed concrete structures , T. Y. Lin & Burns, Wiley Publications
4. Prestressed Concrete Basics by Collins / Mitchel

Web Link:

<https://nptel.ac.in/courses/105/104/105104183/>

PAVEMENT ANALYSIS AND DESIGN

Course Learning Objectives:

The objectives of this course are:

1. To know various factors affecting pavement design
2. To know various concepts for the stresses in pavements.
3. To understand material characterisation and mix design concepts.
4. To acquire design principles of flexible and rigid pavements.
5. To acquire design principles of shoulders, overlays and drainage.

Course Outcomes:

At the end of course, Student will be able to

1. Determine stresses in pavements
2. Design bituminous mixes
3. Design flexible pavements using various methods
4. Design rigid pavements using various methods
5. Design shoulders, overlays and drainage.

Unit-I Factors Affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

Unit-II Stresses In Pavements: *Vehicle-Pavement Interaction:* Transient, Random & Damping Vibrations, Steady State of Vibration, Experiments on Vibration, Stress Inducing Factors in Flexible and Rigid pavements; ***Stress in Flexible Pavements:*** Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts.

Unit-III Material Characterisation & Mix Design Concepts: CBR and Modulus of Subgrade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient, Diametral Resilient and Complex (Dynamic) Moduli of Bituminous Mixes. Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilisation and Use of Geo Synthetics.

Unit-IV Design of Flexible Pavements: Flexible Pavement Design Concepts, Asphalt Institute's Methods with HMA and other Base Combinations, AASHTO, Road Note No 29 & IRC Methods, Design of Runways & Taxiways, Design of Low Volume Rural Roads

Design Of Rigid Pavements: Calibrated Mechanistic Design Process, PCA, AASHTO & IRC Specifications, Introduction to Prestressed and Continuously Reinforced Cement Concrete Pavement Design, Rigid Pavement Design for Low Volume Rural Roads.

Unit-V Design Of Shoulders, Overlays & Drainage: Shoulder Design Considerations, Traffic Prediction, Parking, Regular & Encroaching Traffic, Thickness Design Specifications for Flexible & Rigid Shoulders; Types & Design of Overlays: AI's Principal Component Analysis & IRC Methods of Overlay Design, Importance of Profile Correction Course; Pavement Drainage Concepts, Drainage Related Failures, Inflow-Outflow Concepts, Condition of Continuity, Surface and Sub Surface Drainage Design Specifications

Text Books:

1. Pavement Analysis and Design, Yang H. Huang, Pearson Education, Second Edition.
2. Principles of Pavement Design, Yoder. J. & Witczak Mathew, W. John Wiley & Sons Inc
3. Pavement Design, Srinivasa Kumar R, Universities Press, Hyderabad

References:

1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications
2. Pavement and Surfacing for Highway & Airports, Micheal Sargious, Applied Science Publishers Limited.
3. Principles of Transportation Engineering, Patha Chakraborty and Animesh Das, PHI Learning Private Limited, Delhi

Web Link:

1. <https://nptel.ac.in/courses/105/104/105104098/>

INDUSTRIAL WATER & WASTE WATER MANAGEMENT

Course Learning Objectives:

The course will address the following:

1. Enables the student to distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation.
2. To impart knowledge on selection of treatment methods for industrial wastes water.
3. To know the common methods of treatment in different industries
4. To acquire knowledge on operational problems of common effluent treatment plant.
5. To know treatment methods for any industrial waste water.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Suggest treatment methods for any industrial waste water.
2. Learn the manufacturing process of various industries.
3. Student will be in a position to decide the need of common effluent treatment plant for the industrial area in their vicinity
4. Knowledge on selection of treatment methods for industrial wastes water
5. Common methods of treatment in different industries

SYLLABUS:

UNIT – I

Industrial water Quantity and Quality requirements: Boiler and cooling waters– Process water for Textiles, Foodprocessing, BreweryIndustries, powerplants, fertilizers, sugarmills.

UNIT – II

Miscellaneous Treatment: Use of Municipal wastewater in Industries – Advanced water treatment - Adsorption, Reverse Osmosis, Ion Exchange, Ultra filtration, Freezing, elutriation, Removal of Iron and Manganese, Removal of Colour and Odour.

UNIT – III

Basic theories of Industrial Wastewater Management: Industrial waste survey - Measurement of industrial wastewater Flow-generation rates – Industrial wastewater sampling and preservation of samples for analysis.

Wastewater characterization- Toxicity of industrial effluents-Treatment of wastewater-unit operations and processes- Volume and Strength reduction –Neutralization – Equalization and proportioning-recycling, reuse and resources recovery.

UNIT – IV

Industrial wastewater disposal management: discharges into Streams, Lakes and oceans and associated problems, Land treatment – Common Effluent Treatment Plants: advantages and suitability, Limitations and challenges- Recirculation of Industrial Wastes- Effluent Disposal Method.

UNIT – V

Process and Treatment of specific Industries-1: Manufacturing Process and origin, characteristics, effects and treatment methods of liquid waste from Steel plants, Fertilizers, Textiles, Paper and Pulp industries, Oil Refineries, Coal and Gas based Power Plants.

Text books:

1. Wastewater Treatment by M.N. Rao and A.K. Dutta, Oxford & IBH, NewDelhi.
2. Industrial Wastewater Treatment by KVSG MuraliKrishna.
3. Industrial Wastewater treatment by A.D. Patwardhan, PHI Learning,Delhi

References:

1. Industrial Water Pollution Control by W. Wesley Eckenfelder, Mc- GrawHill, Third Edition
2. WastewaterEngineeringbyMetcalfandEddyInc.,TataMcGrawhillCo.,NewDelhi
3. Wastewater Treatment- Concepts and Design Approach by G.L. Karia& R.A. Christian, Prentice Hall of India.

Web Link:

<https://nptel.ac.in/courses/105/106/105106119>

ENVIRONMENTAL IMPACT ASSESSMENT

Course Learning Objectives:

The objective of this course is:

1. To impart knowledge on different concepts of Environmental Impact Assessment
2. To know procedures of risk assessment
3. To learn the EIA methodologies and the criterion for selection of EIA methods
4. To know the procedures for environmental clearances and audit
5. To appreciate the importance of stakeholder participation in EIA

Course Learning Outcomes

Upon successful completion of this course, the students will be able to:

1. Prepare EMP, EIS, and EIA report
2. Identify the risks and impacts of a project
3. Selection of an appropriate EIA methodology
4. Evaluation the EIA report
5. Know the role of stakeholder and public hearing in the preparation of EIA

SYLLABUS:

UNIT – I Basic concept of EIA: Elements of EIA-factors affecting EIA-Initial environmental Examination-life cycle analysis preparation of Environmental Base map- Classification of environmental parameters – role of stakeholders in the EIA preparation – stages in EIA

UNIT – II E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis – EIS and EMP

UNIT-III Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives- application of remote sensing and GIS for EIA.

UNIT-IV Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures - E I A with reference to surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Generalized approach for assessment of Air pollution Impact.

UNIT – V Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation. Environmental Risk Assessment and Risk management in EIA: Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment

EIA notification by Ministry of Environment and Forest (Govt. of India):

Provisions in the EIA notification, procedure for environmental clearance, procedure for conducting environmental impact assessment report- evaluation of EIA report.

Text Books:

1. Environmental Impact Assessment, Canter Larry W., McGraw-Hill education
2. Edi (1996)
3. Environmental Impact Assessment Methodologies, Y. Anjaneyulu, B. S. Publications, Hyderabad.
4. Publications, Hyderabad.

References:

1. Environmental Science and Engineering, J. Glynn and Gary W. Hein Ke – PrenticeHall Publishers
2. Environmental Science and Engineering, Suresh K. Dhaneja, S. K. ,Katania Publication, New Delhi.

Web Link:

<https://nptel.ac.in/courses/155/126/105136119>

COMPUTER AIDED STRUCTURAL ENGINEERING LABORATORY (CASE)

Course Learning Objectives:

The course is designed to

1. learn to analyze 2 D frame steel tubular truss using structural analysis software
2. learn to analyze 3D frame steel tubular truss using structural analysis software
3. learn to analyze 2 D and 3D frame RCC frame using structural analysis software
4. learn to analyze design of beams at various loading and support condition
5. learn to analyze simple towers

Course outcomes

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

1. understand the stresses and forces output
2. read the design output
3. understand steel detailing
4. understand the quantities
5. use structural analysis software to analyze and design 2D and 3D frames

Computer Aided Design and Drawing:

Software:

1. STAAD PRO
2. ETABS
3. SAP 2000

Excercises:

1. Beams subject to various loading and support conditions
2. 2-D Frame Analysis and Design
3. Steel 2D Tabular Truss Analysis and Design
4. Steel 3D Tabular Truss Analysis and Design
5. 3-D RC Frame Analysis and Design
6. Multi storey building analysis and design
7. Multi storey building subjected to wind loads analysis and design
8. Multi storey building subjected to earth quake loads analysis and design
9. Simple Tower Analysis and Design (communication tower (or) transmission tower)

Reference:

1. 'Concept and Techniques of GIS' by C.P.L.O. Albert, K.W. Yong, Printice Hall Publishers.
2. Design of R C C Buildings using Staad Pro V8i with Indian Examples English by T.S sarma.
3. Illustrated Design of Reinforced Concrete Buildings by Dr. S.r.karve and Dr. V.l.shah



DEPARTMENT OF CIVIL ENGINEERING
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VIZIANAGARAM-535003, ANDHRA PRADESH, INDIA.

B.Tech COURSE STRUCTURE (2019 Admitted batch)

IV B.Tech – II Semester

S. No.	Code	Course	POs	L	T	P	Credits	
1	PC	PROJECT PLANNING & MANAGMENT		3	0	0	3	
2	PE	ELECTIVE -IV <ul style="list-style-type: none">• GROUND IMPROVEMENT TECHNIQUES• FINITE ELEMENT METHOD• SOIL STRUCTURE INTERACTION• URBAN TRANSPORT & PLANNING		3	0	0	3	
3	PE	ELECTIVE -V <ul style="list-style-type: none">• REPAIR & REHABILITATION OF STRUCTURES• ENVIRONMENTAL & INDUSTRIAL HYGIENE• SOIL DYNAMICS & FOUNDATIONS• AIR POLLUTION & CONTROL		3	0	0	3	
4	PC	PROJECT WORK -II		0	0	0	9	
		TOTAL CREDITS						18

PROJECT PLANNING AND MANAGEMENT

Course Objective:

The objectives of this course are to:

1. To make them understand the concepts of Project Management for planning to execution of projects.
2. To make them understand the feasibility analysis in Project Management and network analysis tools for cost and time estimation.
3. To enable them to comprehend the fundamentals of Contract Administration, Costing and Budgeting.
4. Make them capable to analyze, apply and appreciate contemporary project management tools and methodologies in Indian context.
5. Understand the How Subcontract Administration and Control are practiced in the Industry.

Course Outcomes:

Upon successful completion of this course, student will be able to

1. Understand project characteristics and various stages of a project.
2. Understand the conceptual clarity about project organization and feasibility analyses – Market, Technical, Financial and Economic.
3. Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.
4. Apply the risk management plan and analyse the role of stakeholders.
5. Understand the contract management, Project Procurement, Service level Agreements and productivity.

UNIT-I

PERT and CPM : Introduction : Origin of PERT and CPM, Planning, Scheduling and controlling Bar charts, Milestone charts, weaknesses in Bar charts, PERT and CPM networks – Comparison, Event, Activity, Rules for drawing networks, Numbering the events (Fulkerson's law : Dummy activities, Time estimate-Expected time, Earliest allowable occurrence time, Latest allowable occurrence time, slack, project duration, probability of completion, Start and Finish time estimates, Floats, Project scheduling, Critical and sub-critical path.

UNIT-II

Cost analysis / updating / resource scheduling: Cost Analysis direct and indirect costs, operation time, Normal and crash points, optimizing project cost, crash limit, Free float limit, Optimization. Updating – Process of updating; when to update, Resource scheduling – Resource smoothing. Resource levelling, circle notation and arrow notation.

UNIT-III

Contracts: Contracts – Element of contract, offer acceptance and consideration, valid contract, Department execution of works, Master Roll Form 21. Piece work Agreement form, work order; Contract system with tenders – Definitions – Contract, Contractor, Quotation, Earnest money, Security money, Tender, Tender notice, Tender form, Bidding procedure, Irregularities in Bidding, award.

UNIT-IV

Types of contracts – Lumpsum contract; Lumpsum and schedule contract, Item rate contract, sub-contracts, joint ventures, Arbitration Disputes and claim settlement.

Management – Scope of the Construction Management, Significance of Construction management, Concept of Scientific Management, Qualities of Manager.

UNIT- V

Organization – Authority, Policy, Recruitment process and Training Development of Personnel Department Labour problems, Labour legislation in India, Workmen compensation Act 1923, and subsequent amendments, Minimum Wages Act 1948.

References:

- 1) PERT and CPM – L. S. Srinath.
- 2) PERT and CPM – Punmia.
- 3) Estimating and Costing – B.N. Dutta.

References:

1. Project Planning and Management – Louis Goodman
2. Construction Management and Planning – Guna and Sen Gupta

Weblink:

<https://nptel.ac.in/courses/105/103/105103093/>

GROUND IMPROVEMENT TECHNIQUES

Course Learning Objectives:

The objective of this course is:

1. To enable the student to find out the properties of the soil and classify it.
2. To impart the concept of Densification of soils
3. To Understand the difference between dry and Submerged soil strength
4. To enable the students to differentiate between compaction and consolidation & water draining techniques
5. To enable the student to understand the concept of strength of soils through Reinforcement.

Course Outcomes:

Upon the successful completion of this course

1. The student must know the definition of the various parameters related to soil strength & density.
2. Attaining knowledge on methods attaining the desirable properties of the soils using compaction techniques.
3. Attaining knowledge on methods attaining the desirable properties of the soils using Drainage
4. Attaining knowledge on methods of dewatering the soils using Advanced techniques
5. The student should be able to apply the above concepts in day-to-day civil engineering practice.

UNIT - I

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

UNIT - II

Mechanical Modification – Principles of soil densification – Properties of Compacted soil, Compaction control tests, Specification of compaction requirements, Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT - III

Hydraulic Modification – Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Filtration, Drainage and seepage control with Geosynthetics, Preloading and vertical drains, Electro-kinetic dewatering.

UNIT - IV

Physical and Chemical Modification – Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

UNIT - V

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, bar, mesh, sheet and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS:

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications
2. Patra, N.R. (2012)– Ground Improvement Techniques, Vikas Publications
3. Purushothama Raj (1995) – Ground Improvement Techniques, Laxmi Publications, India

REFERENCES:

1. M. P. Moseley and K. Krisch (2006) – Ground Improvement, 2nd Edition, Taylor and Francis.
2. K. Krisch & F. Krisch (2010) – Ground Control and Improvement, John Wiley & Sons 1994.
3. Nicholson, P.G. (2015). Soil Improvement and Ground Modification methods, Elsevier Publishers.

Web Link

<https://nptel.ac.in/courses/105/108/105108075/>

FINITE ELEMENT METHOD

Course Learning Objectives:

The objective of this course is:

1. Understand boundary value problems involving Numerical technique of Finite element method
2. Equip the students with the fundamentals of Finite Element Analysis
3. Enable the students to formulate the design problems into FEA.
4. Enable the students to solve Boundary value problems using FEM.
5. Develop finite element formulation of one and two dimensional problems and solve them.

Course Outcomes:

Upon completion of the course, the student will be able to

1. Solve simple boundary value problems using Numerical technique of Finite element method.
2. Expertise in fundamentals of Finite Element Analysis
3. Formulate the design problems into FEA.
4. Solve Boundary value problems using FEM.
5. Develop finite element formulation of one and two dimensional problems and solve them.

SYLLABUS:

UNIT-I

Introduction: Review of stiffness method- Principle of Stationary potential energy-Potential energy of an elastic body- Rayleigh-Ritz method of functional approximation.

UNIT-II

Principles of Elasticity- Equilibrium Equations- Strain Displacement relationships- Constitutive relationship for plane stress, plane strain and axi symmetric bodies of revolution with axi symmetric loading.

UNIT-III

Finite Element formulation of truss element: Stiffness matrix- properties of stiffness matrix –Selection of approximate displacement functions- solution of a plane truss- transformation matrix- Galerkin's method for 1-D truss – Computation of stress in a truss element.

UNIT-IV

Finite element formulation of Beam elements: Beam stiffness- assemblage of beam stiffness matrix- Examples on Analysis of beams Subjected to Concentrated and Distributed loading.

UNIT-V

Finite element formulation for plane stress and plane strain problems- Derivation of CST and LST stiffness matrix and equations-treatment of body and surface forces

TEXT BOOKS

1. 'A first course in the Finite Element Method' by Daryl L. Logan, Thomson Publications.
2. 'Introduction to Finite Elements in Engineering' by Tirupati R. Chandrupatla, Ashok D. Belgundu, PHI publications.
3. 'Introduction to Finite Element Method' by Desai & Abel CBS Publications.

REFERENCES:

1. 'Concepts and applications of Finite Element Analysis' by Robert D. Cook, Michael E Plesha, John Wiley & sons Publications.
2. 'Text book of Finite Element Analysis' by P. Seshu, Prentice Hall of India.

Web Link

<https://nptel.ac.in/courses/105/105/105105041/>

SOIL STRUCTURE INTERACTION

Course Objectives:

1. Know the methods of production of aggregate products and concreting and usage of machinery required for the works.
2. To understand the behavior of soil and its interaction analysis with the structure
3. To introduce to the student the concept of project management including network drawing and monitoring
4. To introduce various equipments like earth moving equipment, trucks and handling equipment
5. Basics of soil structure Interaction

Course Outcomes:

1. Understand the functioning of various earth moving equipment
2. Know the methods of production of aggregate products and concreting and usage of machinery required for the works.
3. To understand the behavior of soil and its interaction analysis with the structure
4. To introduce to the student the concept of project management including network drawing and monitoring
5. To introduce various equipments like earth moving equipment, trucks and handling equipment,.

Syllabus:

Unit-I :

Soil-Foundation Interaction: Introduction to soil-foundation interaction problems, Soil behaviour, Foundation behaviour, Interface behaviour, Scope of soil foundation interaction analysis, soil response models, Winkler, Elastic continuum, Two parameter elastic models, Elastic-plastic behaviour, Time dependent behaviour.

Unit-II :

Beam on Elastic Foundation- Soil Models: Infinite beam, Two-parameters models, Isotropic elastic half space model, Analysis of beams of finite length, combined footings.

Unit-III :

Plates on Elastic Continuum: Thin and thick rafts, Analysis of finite plates, Numerical

analysis of finite plates.

Unit-IV:

Analysis of Axially and Laterally Loaded Piles and Pile Groups: Elastic analysis of single pile, Theoretical solutions for settlement and load distributions, Analysis of pile group, Interaction analysis, Load distribution in groups with rigid cap, Load deflection prediction for laterally loaded piles, Subgrade reaction and elastic analysis, Interaction analysis, Pile-raft system

Unit-V :

Ground-Foundation-Structure Interaction: Effect of structure on ground-foundation interaction, Static and dynamic loads.

TEXT BOOKS:

1. Selvadurai, A. P. S. – Elastic Analysis of Soil-Foundation Interaction, 1979 Rolando P. Orense,
2. Nawawi Chouh & Michael J. Pender – Soil-Foundation-Structure Interaction,
3. CRC Press, 2010 Taylor & Francis Group, London, UK.

REFERENCES:

1. Soil Structure Interaction – The real behaviour of structures, the institution of structural engineers
2. Poulos, H. G., and Davis, E. H. – Pile Foundation Analysis and Design, 1980
3. Scott, R. F. – Foundation Analysis, Prentice Hall, Englewood Cliffs, 1981

Web Link:

<https://nptel.ac.in/courses/105/105/105105200/>

URBAN TRANSPORTATION PLANNING

Course Learning Objectives:

The objective of this course is:

1. To introduce to the student the concept of project management including network drawing and monitoring
2. To introduce various equipments like earth moving equipment, trucks and handling equipment, aggregate production
3. To introduce the importance of safety in construction projects
4. Methods of production of aggregate products and concreting
5. Usage of machinery required for the works

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Appreciate the importance of construction planning
2. Understand the functioning of various earth moving equipment
3. Know the methods of production of aggregate products and concreting and usage of machinery required for the works.
4. Apply the gained knowledge to project management and construction techniques
5. Trucks and handling equipment, aggregate production and construction equipment and machinery

SYLLABUS:

UNIT –I Urban Transportation Problems & Travel Demand: Urban Issues, Travel Characteristics, Evolution of Planning Process, Supply and Demand – Systems approach; Trends, Overall Planning process, Long term Vs Short term planning, Demand Function, Independent Variables, Travel Attributes, Assumptions in Demand Estimation, Sequential, and Simultaneous Approaches, Aggregate and Disaggregate Techniques.

UNIT –II Data Collection And Inventories: Collection of data – Organisation of surveys and Analysis, Study Area, Zoning, Types and Sources of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Owner Ship.

UNIT –III Trip Generation & Distribution: UTPS Approach, Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models, Commercial Trip Rates; Trip Distribution: Growth Factor Methods, Gravity Models, Opportunity Models, Time Function Iteration Models.

UNIT –IV Mode Choice Analysis: Mode Choice Behaviour, Competing Modes, Mode Split Curves, Aggregate and Disaggregate Approaches; Discrete Choice Analysis, Choice sets, Maximum Utility, Probabilistic Models: Binary Logit, Multinomial Logit Model – IIA property; Aggregation

UNIT –V Traffic Assignment: Diversion Curves; Basic Elements of Transport Networks, Coding, Route Properties, Path Building Criteria, Skimming Tree, All-or-Nothing Assignment, Capacity Restraint Techniques, Reallocation of Assigned Volumes, Equilibrium Assignment.

Text Books:

1. Introduction to Urban System Planning, Hutchinson, B.G., McGraw Hill.
2. Transportation Engineering - An Introduction, Khisty C.J., Prentice Hall
3. Urban Transport planning by Michael D. Meyer & Eric J Miller

References:

1. Introduction to Transportation Planning, Bruton M.J., Hutchinson of London.
2. Fundamentals of Transportation Planning, Papacostas, Tata McGraw Hill
3. Urban Transportation Planning: A decision oriented Approach, Mayer M and Miller E, McGraw Hill

Web Link:

<https://nptel.ac.in/courses/105/106/105106058/>

REPAIR AND REHABILITATION OF STRUCTURES

Course Learning Objectives:

The objective of this course is:

1. Familiarize Students with deterioration of concrete in structures
2. Equip student with concepts of NDT and evaluation
3. Understand failures and causes for failures in structures
4. Familiarize different materials and techniques for repairs
5. Understand procedure to carry out Physical evaluation of building and prepare report.

Course Outcomes:

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

1. Explain deterioration of concrete in structures
2. Carry out analysis using NDT and evaluate structures
3. Assess failures and causes of failures in structures
4. Carry out Physical evaluation and submit report on condition of the structure.
5. Carry out grouting and precautionary measures of the structures.

SYLLABUS:

UNIT-I

Deterioration of concrete in structures: Physical processes of deterioration like Freezing and Thawing, Wetting and Drying, Abrasion, Erosion, Pitting, Chemical processes like Carbonation, Chloride ingress, Corrosion, Alkali aggregate reaction, Sulphate attack Acid attack, temperature and their causes, Mechanism, Effect, preventive measures. - Cracks: Cracks in concrete, type, pattern, quantification, measurement & preventive measures.

UNIT-II

Non- Destructive Testing-Non destructive test methods for concrete including Rebound hammer, Ultrasonic pulse velocity, Rebar locator, Corrosion meter, Penetration resistance and Pull-out test, Core cutting- Corrosion: Methods for corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data.

UNIT-III

Failure of buildings: Definition of building failure-types of failures- Causes of Failures- Faulty Design, Accidental over Loading, Poor quality of material and Poor Construction practices-Fire damage- Methodology for investigation of failures-diagnostic testing methods and equipment's-repair of cracks in concrete

UNIT-IV

Materials for repair and rehabilitation -Admixtures- types of admixtures- purposes of using admixtures- chemical composition- Natural admixtures- Fibres- wraps- Glass and Carbon fibre wraps- Steel Plates-Concrete behavior under corrosion, disintegrated mechanisms – moisture effects and thermal effects–Visual investigation-Acoustical emission methods – Corrosion activity measurement-chloride content – Depth of carbonation- Impact echo methods- Ultrasound pulse velocity methods- Pullout tests.

UNIT:V

Repair Techniques: Grouting, Jacketing, Shotcreting, externally bonded plates, Nailing, Under pinning and under water repair; Materials, Equipment's, Precaution sand Processes. Case studies: related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion and erosion damaged structures.

TEXTBOOKS:

1. 'Maintenance & Repair of Civil Structures' by B.L.Gupta & Amit Gupta.
2. 'Rehabilitation of Concrete Structures' by B.Vidivelli, StandardPublishers.

REFERENCES:

1. 'Concrete Structures – protection Repair and Rehabilitation' by R.Doodge Woodson, BH Publishers
2. 'Concrete Bridge Practice Construction, Maintenance & Rehabilitation' byV. K. Raina.

WEB LINK:

<https://nptel.ac.in/courses/105/106/105106202/>

ENVIRONMENTAL AND INDUSTRIAL HYGIENE

Course Learning Objectives:

1. Impart knowledge on fundamental aspects of air pollution & control, noise pollution, and solid waste management.
2. Provide basic knowledge on sustainable development.
3. Introduces some basics of sanitation methods essential for protection of community health.
4. Differentiate the solid and hazardous waste based on characterization
5. Identify the air pollutant control devices

Course Learning Outcomes:

By the end of successful completion of this course, the students will be able to:

1. Have knowledge on the NAAQ standards and air emission standards
2. Differentiate the treatment techniques used for sewage and industrial wastewater treatment methods.
3. Understand the fundamentals of solid waste management, practices adopted in his town/village and its importance in keeping the health of the city.
4. Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics.
5. Appreciate the importance of sustainable development while planning a project or executing an activity.

Syllabus:

Unit - I

Introduction: Need for developing Environment, Health and Safety systems in work places. Status and relationship of Acts, Regulations and Codes of Practice. Role of trade union safety representatives.

Unit - II

Occupational Health and Hygiene: Definition of the term occupational health and hygiene. Categories of health hazards. Exposure pathways and human responses to hazardous and toxic substances. Advantages and limitations of environmental monitoring and occupational exposure limits. Hierarchy of control

measures for occupational health risks. Control methods and reduction strategies for noise, radiation and excessive stress. OHSAS

Unit - III

Workplace Safety and Safety Systems: Features of the satisfactory design of work premises, ventilation. Safe installation and use of electrical supplies. Fire safety and first aid provision. Significance of human factors in the establishment and effectiveness of safe systems.

Safe systems of work for manual handling operations. Control methods to eliminate or reduce the risks arising from the use of work equipment. Requirements for the safe use of display screen equipment. Procedures and precautionary measures necessary when handling hazardous substances- Contingency arrangements for events of serious and imminent danger.

Unit - IV

Techniques of Environmental Safety: Methods of effective implementation and review of health & safety policies. Functions and techniques of risk assessment, Investigation of accidents- Principles of quality management systems in health and safety management.

Unit - V

Fatigue: Types of fatigue - circadian rhythms- sleep cycle-sleep debt-effects of fatigue-factors contributing to fatigue- mitigation of fatigue. Ergonomics: definition-boundaries of ergonomics-objectives and principles of ergonomics-ergonomics relation with health and safety-ergonomics problems in work place-ergonomics improvements-identification of poor posture and risks.

TEXT BOOKS:

2. Environmental Engineering, by Ruth F. Weiner and Robin Matthews – 4th Edition Elsevier, 2003.
3. Environmental Science and Engineering by J.G. Henry and G.W. Heinke – Pearson Education.
4. Environmental Engineering by Mackenzie L Davis & David A Cornwell. McGraw Hill Publishing.

Reference Books

1. Environmental and Health and Safety Management by Nicholas P. Cheremisinoff and Madelyn L.Graffia, William Andrew Inc. NY, 1995

2. The Facility Manager's Guide to Environmental Health and Safety by Brian Gallant, GovernmentInst Publ., 2007.
3. Effective Environmental, Health, and Safety Management Using the Team Approach by Bill Taylor, Culinary and Hospitality Industry Publications Services 2005.

Web Link:

<https://nptel.ac.in/courses/110/105/110105094/>

SOIL DYNAMICS AND FOUNDATIONS

Course Learning Objectives:

1. About the fundamentals of vibrations
2. About the behavior and properties/response of soil as a material which is subjected to various types of dynamic or cyclic time-dependent loadings.
3. The design and analysis for machine foundations come along with this course to consider the dynamic properties of both soil and foundation as combined mass.
4. Phenomena like liquefaction and lateral spreading of soil are also discussed.
5. Discusses about the laboratory and field tests to compute the dynamic soil properties of the soil mass.

Course Outcomes:

1. On successful completion of these course, the student learns fundamentals of vibrations
2. Use theory of vibrations to find the behavior of soil under dynamic loading
3. Design machine foundations under different loads and soil conditions
4. Understand the liquefaction phenomena
5. Conduct various laboratory and field tests to determine the dynamic soil properties and its interpretation.

SYLLABUS:

UNIT-I Introduction: Types of motion- SHM- Fundamental definitions- SDOF systems- Free and forced vibration with and without damping - Constant force and rotating mass type excitation –Types of damping-Equivalent stiffness of springs in series and parallel. – Resonance and its effect - magnification-logarithmic decrement –Transmissibility.

UNIT-II Theories of Vibration Analysis- EHS Theory and lumped parameter model- Different modes of vibration- Natural frequency of foundation soil system – Barkan and IS methods – Pressure bulb concept – Reisner Theory – Limitations of Reisner theory – Sung's solutions -- Pauw's Analogy – Heigh's Theory.

UNIT-III Dynamic properties of soils, Determination of E, G and Poisons ratio from field and

laboratory tests, recommendations of Indian codes- Stress waves in bounded elastic medium- Use of wave theory in the determination of elastic properties, Elastic coefficients of soils and their determination- damping factor from free and forced vibration tests.– Block vibration test – Determination of Damping factor.

UNIT-IV Types of machine foundations – general requirements design – criteria for machine foundations, permissible amplitudes and bearing pressure

Design data, design criteria, IS code provisions for the design foundations of reciprocating machines.

UNIT-V Design data, design criteria, IS code provisions for the design foundations of Impact type of machines.

Text Book:

1. Soil Mechanics and Machine foundations, Swami Saran, Galgotia Publications.
2. Fundamentals of Soil Dynamics, B M Das, Centage Learning
3. Dynamics of bases and Foundations, D D. Barkar

References:

1. Vibrations of Soils and Foundations, Richart Hall andWoods
2. Vibration Analysis and Foundation Dynamics, NSV Kameswara Rao, Wheeler Publishing, NewDelhi.
3. Hand book on Machine foundations by P. Srinivasulu

Web Link:

<https://nptel.ac.in/courses/105/101/105101005>

AIR POLLUTION & CONTROL

Course Objectives:

1. To know the analysis of air pollutants
2. To know the Threshold Limit Values(TLV) of various air pollutants
3. To acquire the design principles of particulate and gaseous control
4. To learn plume behavior in different environmental conditions
5. To learn carbon credits for various day to day activities

Course Outcomes:

Upon successful completion of this course, the students will be able to:

1. Decide the ambient air quality based the analysis of air pollutants.
2. The design principles of particulate and gaseous control measures for an industry.
3. Judge the plume behavior in a prevailing environmental condition.
4. Estimate carbon credits for various day to day activities.
5. Control source of design and equipment.

SYLLABUS:

UNIT-I

Air Pollution: Sampling and analysis of air pollutants, conversion of ppm into $\mu\text{g}/\text{m}^3$. Definition of terms related to air pollution and control-secondary pollutants - Indoor air pollution - Climate Change and its impact – Carbon Trade.

UNIT-II

Thermodynamics and Kinetics of Air-pollution: Applications in the removal of gases like SO_x , NO_x , CO and HC - Air- fuel ratio- Computation and Control of products of combustion, Automobile pollution. Odour pollution control, Flares.

UNIT- III

Meteorology and Air Pollution: Properties of atmosphere: Heat, Pressure, Wind forces, Moisture and relative Humidity, Lapse Rates- Influence of Terrain and Meteorological phenomenon plume behavior and Air Quality –Windrose diagrams, Plume Rise Models.

UNIT-IV

Ambient Air Quality Management: Monitoring of SPM, SO_2 ; NO_x and CO - Stack Monitoring for flue gases – Micro - meteorological monitoring –Weather Station. Emission Standards-Gaussian Model for Plume Dispersion.

UNIT-V

Air Pollution Control: Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control Equipments – Settling Chambers, Cyclone separators– Fabric filters – scrubbers, Electrostatic precipitators.

TEXTBOOKS:

1. Air Pollution by M.N.Rao and H.V.N.Rao– Tata McGrawHill Company.
2. Air Pollution and Control by KVSG Murali Krishna, Laxmi Publications, NewDelhi.

REFERENCE:

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

Web link:

<https://nptel.ac.in/courses/105/102/105102089/>