

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
COURSE STRUCTURE
(w.e.f Academic Year 2019-20)

JNTUA CEA Curriculum
B. Tech Course Structure

CIVIL ENGINEERING

Semester - 0 (Theory - 8, Lab -7) Common for All Branches of Engineering				
S.No	Course Code	Course Name	Category	L-T-P-C
1		Physical Activities -- Sports, Yoga and Meditation, Plantation	MC	0-0-12-0
2		Career Counseling	MC	4-0-4-0
3		Orientation to all branches -- career options, tools, etc.	MC	6-0-0-0
4		Orientation on admitted Branch -- corresponding labs, tools and platforms	EC	4-0-6-0
5		Proficiency Modules & Productivity Tools	ES	4-2-4-0
6		Assessment on basic aptitude and mathematical skills	MC	4-0-6-0
7		Remedial Training in Foundation Courses	MC	4-2-4-0
8		Human Values & Professional Ethics	MC	6-0-0-0
9		Communication Skills -- focus on Listening, Speaking, Reading, Writing skills	BS	4-2-4-0
10		Concepts of Programming	ES	4-0-4-0
Total				40-6-44-0

Semester - 1					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1	19A15101	Linear Algebra And Calculus	BS	3-1-0	4
2	19A15301	Engineering Chemistry	BS	2-1-0	3
3	19A10502	Python Programming	ES	3-1-0	4
4	19A10302	Engineering Workshop	LC	0-0-2	1
5	19A10301	Engineering Graphics	ES	1-0-4	3
6	19A15302	Engineering Chemistry Lab	BS	0-0-3	1.5
7	19A10505	Python Programming Lab	ES	0-0-3	1.5
Total					18

Semester - 2					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1	19A10101	Strength of Materials-1	PC	3-1-0	4
2	19A15501	Communicative English 1	HS	2-0-0	2
3	19A15102	Differential Equations and Vector Calculus	BS	3-0-0	3
4	19A15203	Engineering Physics	BS	2-1-0	3
5	19A10102	Building Materials and Construction	PC	3-1-0	4
6	19A10103	Strength of Materials Lab	PC	0-0-3	1.5
7	19A10104	Civil Engineering Workshop	LC	0-0-3	1.5
8	19A15502	Communicative English Lab-1	HS	0-0-2	1
9	19A15204	Engineering Physics Lab	BS	0-0-3	1.5
Total					21.5

Semester – 3					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.	19A20601	Complex Variables, Transforms and PDE	BSC	3-0-0	3
2.	19A20101	Strength of Materials-II	PCC	2-1-0	3
3.	19A20102	Fluid Mechanics	PCC	2-1-0	3
4.	19A20103	Surveying	PCC	2-1-0	3
5.	19A20104	Engineering Geology	ESC	2-0-0	2
6.	19A20105	Structural Analysis-I	PCC	2-1-0	3
8.	19A20106	Surveying Lab	PCC	0-0-3	1.5
9.	19A20107	Engineering Geology Lab	ESC	0-0-3	1.5
10.	19A20602	Exploratory Data Analysis Lab	BSC	0-0-3	1.5
11.	19A10804	Environmental Science	MC	3-0-0	0
Total					21.5

Semester – 4					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.	19A20108	Structural Analysis-II	PCC	2-1-0	3
2.	19A20109	Building Planning and Drawing	PCC	2-1-0	3
3.	19A20110	Hydraulics and Hydraulic Machinery	PCC	2-1-0	3
4.	19A20111	Estimation, Costing and Valuation	PCC	2-1-0	3
5.	19A20603	Numerical Methods, Probability & Statistics	BSC	3-0-0	3
6.	19A20112	Water resources Engineering-I	PCC	3-0-0	3
7.	19A20901	Universal Human Values	HE	2-0-0	2
8.	19A20113	Computer Aided Drafting Lab	PCC	0-0-3	1.5
9.	19A20114	Fluid Mechanics and Hydraulic Machinery Lab	PCC	0-0-3	1.5
10.	19A28801	Biology For Engineers	MC	3-0-0	0
Total					23

Semester – 5					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.	19A50101	Design of Reinforced Concrete Structures	PCC	2-1-0	3
2.	19A50102	Concrete Technology	PCC	3-0-0	3
3.	19A50103	Environmental Engineering	HSMC	3-0-0	3
4.	19A50104	Geotechnical Engineering-I	PCC	2-1-0	3
5.	19A50105 19A50106 19A50107	Professional Elective-I 1. Water Resources Engineering-II 2. Subsurface Investigation and Instrumentation 3. Cost Effective Housing Techniques	PEC-1	3-0-0	3
6.	19A50108 19A50109 19A50110 19A50513T 19A50513L	Open Elective-I 1. Experimental Stress analysis 2. Environmental Impact Assessment 3. Project management 4. Introduction to Java Programming /Lab 19A50513L	OEC-1	2-1-0	3
7.	19A50111	Concrete Technology Lab	PCC	0-0-3	1.5
8.	19A50112	Geotechnical Engineering Lab	PCC	0-0-3	1.5
9.	19A50113	Socially Relevant Project	PR	0-0-1	0.5
10.	19A55401	Research Methodology	MC	3-0-0	0
				Total	21.5

Semester – 6					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.	19A60101	Transportation Engineering-I	PCC	2-1-0	3
2.	19A60102	Geotechnical Engineering-II	PCC	2-1-0	3
3.	19A65501	English Language Skills	HSMC	3-0-0	3
4.	19A60103 19A60104 19A60105	Professional Elective-II 1. Prestressed Concrete 2. Expansive Soils 3. Repair and Rehabilitation of structures	PEC-2	3-0-0	3
5.	19A60106 19A60107 19A60108	Open Elective-II /MOOCS 1. Industrial Waste and Waste watermanagement 2. Intellectual Property Rights 3. Green Buildings	OEC-2	3-0-0	3
6.	19A65401 19A65402 19A65403	Humanities Elective-I 1. Managerial Economics and Financial Analysis 2. Entrepreneurship and Incubation 3. Business Ethics and Corporate Governance	HSMC	3-0-0	3
7.	19A60109	Environmental Engineering Lab	PCC	0-0-3	1.5
8.	19A65502	English Language Skillslab	HSMC	0-0-3	1.5
9.	19A60110	Socially Relevant Project	PR	0-0-1	0.5
10.	19A65406	Constitution of India	MC	3-0-0	0
				Total	21.5

Semester – 7					
Course No	Course Code	Course Name	Category	L-T-P	Credits
1.	19A70101	Finite Element Methods	PCC	2-1-0	3
2.	19A70102	Design of Steel Structures	PCC	2-1-0	3
3.	19A70103 19A70104 19A70105	Professional Elective-III 1. Ground Improvement Techniques 2. Transportation Engineering-II 3. Design and Drawing of Irrigation Structures	PEC-3	3-0-0	3
4.	19A70106 19A70107 19A70108	Open Elective-III 1. Air Pollution and Control 2. Environmental Economics 3. Disaster Management	OEC-3	3-0-0	3
5.	19A75401 19A75402 19A75403	Humanities Elective-II 1. Management Science 2. Organizational Behavior 3. Business Environment	HSMC	3-0-0	3
6.	19A70109	Computer Aided Designing and Drafting Lab	PCC	0-0-3	1.5
7.	19A70110	Highway Materials Lab	PCC	0-0-3	1.5
8.	19A70111	Seminar	PR	0-0-1	0.5
9.	19A70112	Project stage-1	PR	0-0-3	1.5
10.	19A70113	Industrial Training/ Internship/Skill Development/Research Project*	PR	-----	2
Total					22

* Marks shall be awarded in 7th semester, but started at end of 6th semester and complete before beginning of 7th semester.

Semester – 8					
S.No	Course Code	Course Name	Category	L-T-P	Credits
1.	19A80101 19A80102 19A80103	Professional Elective-IV 1. Urban Transportation Planning 2. Building Construction Practice 3. Advanced Foundation Engineering	PEC-4	3-0-0	3
2.	19A80104 19A80105 19A80106	Open Elective-IV 1. Remote Sensing & GIS 2. Global Warming and Climatic changes 3. Health, Safety and Environmental	OEC-4	3-0-0	3
3.	19A80107	Project stage-ii	PR	0-0-14	7
Total					13

Minor degree for 20 credits including Labs and Project

Hon's degree for additional 20 credit

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PROFESSIONAL ELECTIVES

S.No.	PEC-I	PEC-II	PEC-III	PEC-IV
1	Water Resources Engineering-II	Prestressed Concrete	Ground Improvement Techniques	Urban Transportation Planning
2	Subsurface Investigation and Instrumentation	Expansive Soils	Transportation Engineering-II	Building Construction Practice
3	Cost Effective Housing Techniques	Repair and Rehabilitation of Structures	Design and Drawing of Irrigation Structures	Advanced Foundation Engineering

OPEN ELECTIVES

S. No.	OEC-I	OEC-II	OEC-III	OEC-IV
1	Experimental stress analysis	Industrial waste and waste water management	Air pollution and control.	Remote Sensing and GIS
2	Environmental Impact Assessment	Intellectual property Rights	Environmental Economics	Global Warming and Climate changes
3	Project Management	Green Buildings	Disaster management	Health, Safety and Environmental Management Practices

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Areas for Socially Relevant Project in 5th Semester

- a) Water quality analysis in a village /town
- b) Survey camp
- c) Road safety Audit
- d) Environmental impact Audit

Areas for Socially Relevant Project in 6th Semester

- a) Structural condition assessment of school buildings
- b) Water resources management –Audit
- c) Survey of waste management systems- Swach Bharat
- d) Survey of modern building materials & properties
- e) Survey on Implementation of Government Welfare schemes

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MINOR DEGREE IN CIVIL ENGINEERING

S.No	Course No	Course Name	L-T-P	Credits
1.		Strength of materials-I	2-1-0	3
2		Building materials and Construction	3-0-0	3
3		Surveying	2-1-0	3
4		Concrete Technology	3-0-0	3
5		Estimation, Costing and Valuation	2-1-0	3
6		Surveying Lab	0-0-3	1.5
7		Concrete Technology lab	0-0-3	1.5
8		Project	0-0-4	2
Total				20

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HONORS DEGREE IN CIVIL ENGINEERING

S.No	Course No	Course Name	L-T-P	Credits
1.		Soil Dynamics	2-1-0	3
2		Advanced structural Design	2-1-0	3
3		Construction Economics and Finance	2-1-0	3
4		Traffic Analysis	2-1-0	3
5		Sustainable River Basin Management	2-1-0	3
6		Mini Project	0-0-10	5
Total				20

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Course Code	Title Of the Subject	L	T	P	C
	Linear Algebra and calculus	3	1	0	4

SEMESTER-I

Course Objectives:

The objectives of this course are:

1.	This course will illuminate the students in the concepts of calculus and linear algebra.
2.	To equip the students with standard concepts and tools to develop the confidence and ability to handle various real world problems and their applications

Course Outcomes (CO):

On Completion of the course, the students will be able to:

1	Acquire knowledge in finding the rank of the given matrix and its analysis, approximating the given function using series expansions partial differentiation to find the optimum value of the given function ,multiple integration and its applications evaluating special functions such as beta and gamma function.
2	Develop skills in problem solving of the variations in the properties of functions near the stationary points, eigen values and eigen vectors. Multiple integration and special functions.
3	Develop skills in designing mathematical models involving system of linear equations, a function of several variables using mean value theorem , optimization of function of two or three variables , technique of beta and gamma functions .
4	Develop analytical skills in providing solutions for complex problems involving Optimum of a multivariable function, Measuring the curve lengths
5	Applications of linear algebra ,differential calculus and integral calculus to solve engineering problems

Unit 1: Matrices

Rank of a matrix by echelon form, solving homogeneous and non-homogeneous system of linear equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation.

Unit 2: Mean Value Theorems

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof);

Unit 3: Multivariable calculus

Partial derivatives, total derivatives, chain rule, Euler's theorem, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Unit 4: Multiple Integrals

Double integrals, changing to polar coordinates, change of order of integration, double integration in polar coordinates, areas enclosed by plane curves. Evaluation of triple integrals in Cartesian, cylindrical and spherical polar co-ordinates.

Unit 5: Special Functions

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

Textbooks:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

References:

1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 201.
4. Micheael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
5. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
6. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
7. R.L. Garg Nishu Gupta, Engineering Mathematics Volumes-I &II, Pearson Education
8. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
9. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

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Course Code	Title of the Subject	L	T	P	C
19A53101	Engineering Chemistry	2	1	0	3

Semester-I

Course Objectives:

The objectives of this course are:

1.	To familiarize engineering chemistry and its applications
2.	To impart the concept of soft and hard waters, softening methods of hard water
3	To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement

Course Outcomes (CO):

On Completion of the course, the students will be able to:

1	list the differences between temporary and permanent hardness of water, explain the principles of reverse osmosis and electrodialysis. compare quality of drinking water with BIS and WHO standards. illustrate problems associated with hard water - scale and sludge. explain the working principles of different Industrial water treatment processes
2	apply Nernst equation for calculating electrode and cell potentials, apply Pilling Bedworth rule for corrosion and corrosion prevention, demonstrate the corrosion prevention methods and factors affecting corrosion, compare different batteries and their applications
3	explain different types of polymers and their applications, Solve the numerical problems based on Calorific value , select suitable fuels for IC engines, explain calorific values, octane number, refining of petroleum and cracking of oils
4	explain the constituents of Composites and its classification Identify the factors affecting the refractory material, Illustrate the functions and properties of lubricants, demonstrate the phases and reactivity of concrete formation, identify the constituents of Portland cement, enumerate the reactions at setting and hardening of the cement
5	summarize the applications of SEM, TEM and X-ray diffraction in surface characterization, explain the synthesis of colloids with examples, outline the

preparation of nanomaterials and metal oxides identify the application of colloids and nanomaterials in medicine, sensors and catalysis
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Unit 1: Water Technology

(8 hrs)

Introduction –Soft Water and hardness of water, Estimation of hardness of water by EDTA Method - Boiler troubles - scale and sludge, Industrial water treatment – specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, zeolite and ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

Unit 2: Electrochemistry and Applications:

(10 hrs)

Electrodes – concepts, electrochemical cell, Nernst equation, cell potential calculations.

Primary cells – Zn-MnO₂ (Leclanche cell), Li Battery

Secondary cells – lead acid and lithium ion batteries- working of the batteries including cell reactions.

Fuel cells- Basic Principles and Working Principles of hydrogen-oxygen, methanol fuel cells

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses, Factors affecting the corrosion, cathodic and anodic protection, electroplating and electroless plating (Nickel and Copper).

Unit 3: Polymers and Fuel Chemistry:(12 hrs)

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth and coordination polymerization,

Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of PVC and Bakelite

Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol

Fuels – Types of fuels, calorific value, numerical problems based on calorific value; Analysis of coal, Liquid Fuels refining of petroleum, fuels for IC engines, knocking and anti-knock agents, Octane and Cetane values, cracking of oils; alternative fuels- propane, methanol and ethanol, bio fuels.

UNIT-4 Advanced Engineering Materials

(8 hrs)

(i) Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites, properties and Engineering applications

(ii) Refractories- Classification, Properties, Factors affecting the refractory materials and Applications

- (iii) Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils and Applications
- (iv) Building materials- Portland Cement, constituents, phases and reactivity of clinker, Setting and Hardening of cement.

Unit 5: Surface Chemistry and Applications:

(10 hrs)

Introduction to surface chemistry, colloids, micelle formation, synthesis of colloids (any two methods with examples), chemical and electrochemical methods (not more than two methods) of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, solid-gas interface, solid-liquid interface, adsorption isotherm, applications of colloids and nanomaterials – catalysis, medicine, sensors.

Text Books:

1. Engineering Chemistry by KNJayaveera, GVSubba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, Foruth Edition, New Delhi
2. A Text Book of Enigneering Chemistry, Jain and Jain, Dhanapathi Rai Publications, New Delhi

References:

1. A Text book of Engineering Chemistry by SS Dhara, S. Chand Publications, New Delhi
2. Engineering Chemistry by K.B.Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH Pubblications India Pvt Limited.
3. Concepts of Engineering Chemistry- Ashima Srivastavaf and N.N. Janhavi
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and AndraNaidu
5. Chemistry of Engineering Materials, C.V.Agarwal, C.Parameswaramurthy and Andranaidu
6. Text Book of Engineering Chemistry, Shashichawla, Dhanapathirai Publications.

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Course Code	Title of the Subject	L	T	P	C
	Python Programming	3	1	0	4

SEMESTER-I

Course Objectives:

The objectives of this course are:

1.	To teach the fundamentals of Python
2.	To elucidate problem-solving using a Python programming language
3	To introduce a function-oriented programming paradigm through python
4	To train in the development of solutions using modular concepts
5	To introduce the programming constructs of python

Course Outcomes (CO):

On Completion of the course, the students will be able to:

1	Explain the features of Python language (L2)
2	Select appropriate data structure for solving a problem (L4)
3	Design object oriented programs for solving real-world problems (L6)

Unit – I

Introduction: What is a program, Running python, Arithmetic operators, Value and Types.

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Learning Outcomes: Student should be able to

1. List the basic constructs of Python (L1)
2. Solve the problems by applying modularity principle (L3)

Unit – II

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Conditionals and Recursion: floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types,

Learning Outcomes: Student should be able to

1. Apply the conditional execution of the program (L3)
2. Apply the principle of recursion to solve the problems (L3)

Unit - III

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Learning Outcomes: Student should be able to

1. Use the data structure list (L3)
2. Design programs for manipulating strings (L6)

Unit – IV

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.

Classes and Functions:

Learning Outcomes: Student should be able to

1. Apply object orientation concepts (L3)
2. Use data structure dictionaries (L3)
3. Organize data in the form of files (L6)

Unit – V

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning

Classes and Methods: Object oriented features, Printing objects, The init method, The __str__ method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

The Goodies: Conditional expressions, List comprehensions, Generator expressions, any and all, Sets, Counters, defaultdict, Named tuples, Gathering keyword Args,

Learning Outcomes: Student should be able to

1. Plan programs using object orientation approach (L6)
2. Illustrate the principle of inheritance (L4)

Text books:

1. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.

Reference Books:

1. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
3. R. Nageswara Rao, –Core Python Programming, 2nd edition, Dreamtech Press, 2019

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Course Code	Title of the Subject	L	T	P	C
	Engineering Workshop	0	0	2	1

SEMESTER-I

Course Objectives:

The objectives of this course are:

1.	To familiarize students with wood working, sheet metal operations, fitting and electrical housewiring skills
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Course Outcomes (CO):

On Completion of the course, the students will be able to:

1	Apply wood working skills in real world applications.(L3)
2	Build different objects with metal sheets in real world applications.(L3)
3	Apply fitting operations in various applications.(L3)
4	Apply different types of basic electric circuit connections.(L3)
5	Understanding the soldering, brazing and principle of automobile wheel balancing, alignment and operation of power tools.(L2)

Wood Working:

Familiarity with different types of woods and tools used in wood working and make following

- joints
- a) Half – Lap joint *
 - b) Mortise and Tenon joint *
 - c) Corner Dovetail joint or Bridle joint

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets

- a) Tapered tray *
- b) Conical funnel *
- c) Elbow pipe *
- d) Brazing

Fitting:

Familiarity with different types of tools used in fitting and do the following fitting exercises

- a) V-fit *
- b) Dovetail fit *
- c) Semi-circular fit
- d) Wheel Balancing, tubeless tyre puncture and change of two wheeler tyre.

Electrical Wiring:

Familiarities with different types of basic electrical circuits and make the following connections

- a) Parallel and series *
- b) Two way switch *
- c) Godown lighting
- d) Tube light *
- e) Three phase motor
- f) Soldering of wires

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Course Code	Title of the Subject	L	T	P	C
	ENGINEERING GRAPHICS	1	0	4	3

SEMESTER-I

Course Objectives:

The objectives of this course are:

1.	Bring awareness that Engineering Drawing is the Language of Engineers.
2.	To know how to represent letters and numbers in drawing sheets..
3	To know about the different types of the projections, projection of points, straight lines, planes and regular solids
4	To know sectional views and development of different types of surfaces.
5	To know about the projection of orthographic views, isometric views and isometric projections.

Course Outcomes (CO):

On Completion of the course, the students will be able to:

1	Draw various curves applied in engineering.(L2)
2	Plot the projection of points, Lines and planes.(L2)
3	Draw the projections of solids inclined to one or both planes. (L2)
4	Draw the sectional views and development of surfaces.(L2)
5	Draw the orthographic views, Isometric views and isometric projections.(L3)

UNIT-I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance

Curves used in practice:

- a) Conic sections – Ellipse, Parabola, Hyperbola & Rectangular Hyperbola (general method)
- b) Cycloid, Epicycloid and Hypocycloid – Normal and Tangent
- c) Involute – Normal and Tangent

Learning Outcomes:

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

1. Understand the Printing of Letters and dimensioning.(L1)

2. Draw the geometric constructions; drawing parallel and perpendicular lines, and to construct circles, arcs, tangencies, and irregular curves (L6)
3. Construct the Conic sections and cycloidal curves.(L6)

UNIT –II

Principles of orthographic projections – First and Third angle projections Projection of points., Projections of lines inclined to one plane and inclined to both planes – True length, true angles of projected lines – Projection of regular planes inclined to one plane and both planes by rotational method.

Learning Outcomes:

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

1. Understand the Orthographic Projection in four quadrants (L2)
2. Project the points, lines and planes (L6)

UNIT –III

Projection of solids inclined to one plane and inclined to both planes by rotational/auxiliary method – Prism, Cylinder, Pyramid, Cone.

Learning Outcomes:

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

1. Project the solids inclined to one or both planes. (L6)
2. draw the solids by auxiliary method. (L6)

UNIT –IV

Sections of solids: Sections and Sectional views of regular solids – Prism, Cylinder, Pyramid, Cone – True shapes

Development of solids- Prism, Cylinder, Pyramid, Cone

Interpenetration of Solids – Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs cone, square prism Vs square prism.

Learning Outcomes:

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

1. Project the sectional view of regular solids.(L6)
2. Draw the true shapes of the sections.(L2)
3. Draw the development of surfaces of the solids.(L6)
- 4.Develop the sectional parts of the solids.(L2)

UNIT –V

Orthographic projections: Conversion of Pictorial views to orthographic views – Conventions. Isometric projection: Isometric views of lines, plane figures, simple and truncated solids – orthographic views into isometric views.

Learning Outcomes:

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

1. Draw the orthographic views with dimensions.

2. Draw the Isometric views and isometric projections.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers
2. Engineering Drawing, K.L. Narayana & P. Kannaih, Scitech Publishers, Chennai.

REFERENCES:

1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers.
2. Engineering Drawing, Shah and Rana, 2/e, Pearson Education
3. Engineering Drawing and Graphics, Venugopal/New age Publishers
4. Engineering Graphics, John & John.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)

Course Code	Title of the Subject	L	T	P	C
19A53103	Engineering Chemistry lab	0	0	3	1.5

SEMESTER-I

Course Objectives:

The objectives of this course are:

1.	Verify the fundamental concepts with experiments.
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Course Outcomes (CO):

On Completion of the course, the students will be able to:

1	determine the cell constant and conductance of solutions (L3)
2	prepare advanced polymer materials (L2)
3	determine the physical properties like surface tension, adsorption and viscosity (L3)
4	estimate the Iron and Calcium in cement (L3)
5	calculate the hardness of water (L4)

LIST OF EXPERIMENTS

1. Determination of Hardness of a groundwater sample.
2. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base
3. Determination of cell constant and conductance of solutions
4. Potentiometry - determination of redox potentials and emfs
5. Determination of Strength of an acid in Pb-Acid battery
6. Preparation of a polymer
7. Determination of percentage of Iron in Cement sample by colorimetry
8. Estimation of Calcium in port land Cement
9. Adsorption of acetic acid by charcoal
10. Determination of percentage Moisture content in a coal sample
11. Determination of Viscosity of lubricating oil by Red Viscometer 1
12. Determination of Flash and Fire points of fuels
13. Determination of Calorific value of gases by Junker's gas Calorimet

TEXT BOOKS: 1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – J. Mendham et al, Pearson Education.
 2. Chemistry Practical – Lab Manual by Chandra Sekhar, GV Subba Reddy and Jayaveera

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Course Code	Title of the Subject	L	T	P	C
	Python Programming Lab	0	0	3	1.5

SEMESTER-I

Course Objectives:

The objectives of this course are:

1.	To train solving computational problems
2	To elucidate solving mathematical problems using Python programming language
3	To illustrate the features of Python language

Course Outcomes (CO):

On Completion of the course, the students will be able to:

1	Design solutions to mathematical problems (L6)
2	Organize the data for solving the problem (L6)
3	Develop Python programs for numerical and text based problems (L3)
4	Select appropriate programming construct for solving the problem (L5)
5	Illustrate object oriented concepts (L3)

Laboratory Experiments

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator
2. Write a function that draws a grid like the following:

```

+-----+-----+
|       |       |
|       |       |
|       |       |
|       |       |
+-----+-----+
|       |       |
|       |       |
|       |       |
|       |       |

```

+ - - - - + - - - - +

3. Write a function that draws a Pyramid with # symbols

```

      #
    # # #
  # # # # #
# # # # # # #
.
.
.

```

Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice
5. Write a program that draws Archimedean Spiral
6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.
7. The time module provides a function, also named time that returns the current Greenwich Mean Time in -the epoch, which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January 1970.

```
>>> import time
```

```
>>> time.time()
```

```
1437746094.5735958
```

Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

8. Given $n+r+1 \leq 2^r$. n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.
9. Write a program that evaluates Ackermann function
10. The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of $1/\pi$:
11. Write a function called `estimate_pi` that uses this formula to compute and return an estimate of π .

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

It should use a while loop to compute terms of the summation until the last term is smaller than $1e-15$ (which is Python notation for 10^{-15}). You can check the result by comparing it to `math.pi`.

12. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.
13. Given a text of characters. Write a program which counts number of vowels, consonants and special characters.
14. Given a word which is a string of characters. Given an integer say `_n`. Rotate each character by `_n` positions and print it. Note that `_n` can be positive or negative.
15. Given rows of text, write it in the form of columns.
16. Given a page of text. Count the number of occurrences of each letter (Assume case insensitivity and don't consider special characters). Draw a histogram to represent the same
17. Write program which performs the following operations on list's. Don't use built-in functions
 - a) Updating elements of a list
 - b) Concatenation of list's
 - c) Check for member in the list
 - d) Insert into the list
 - e) Sum the elements of the list
 - f) Push and pop element of list
 - g) Sorting of list
 - h) Finding biggest and smallest elements in the list
 - i) Finding common elements in the list
18. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.
19. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book. Compare different books by different authors, written in different eras.
20. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete

words from the file.

21. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.

22. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.

23. Write a program illustrating the object oriented features supported by Python.

24. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorising them into distinction, first class, second class, third class and failed.

25. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format($0 \leq \text{YYYY} \leq 9999$, $1 \leq \text{MM} \leq 12$, $1 \leq \text{DD} \leq 31$) following the leap year rules.

26. Design a Python Script to determine the time difference between two given times in HH:MM:SS format. ($0 \leq \text{HH} \leq 23$, $0 \leq \text{MM} \leq 59$, $0 \leq \text{SS} \leq 59$)

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python 3", 3rd edition, Available at <http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf>
2. Paul Barry, "Head First Python a Brain Friendly Guide" 2nd Edition, O'Reilly, 2016
3. Dainely.Chen "Pandas for Everyone Python Data Analysis" Pearson Education, 2019

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| Course Code | Title of the Subject | L | T | P | C |
|-------------|--------------------------------|---|---|---|---|
| | STRENGTH OF MATERIALS-I | 3 | 1 | 0 | 4 |

SEMISTER-II

Course Objectives:

The objectives of this course are:

- To make the student understand how to resolve forces and moments in a given system
- To make the student able to analyze the trusses.
- To demonstrate the student to determine the centroid and second moment of area
- To make the student understand the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy.
- To impart procedure for drawing shear force and bending moment diagrams for beams.
- To make the student able to analyze flexural stresses in beams due to different loads.

Course Outcomes (CO):

On Completion of the course, the students will be able to:

| | |
|----|---|
| 1 | Understand the different types of force systems |
| 2. | Analysis of trusses by using different methods |
| 2 | Determine the centroid and moment of inertia for different cross-sections |
| 3 | Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy. |
| 4 | Develop shear force and bending moment diagrams for different load cases. |
| 5 | Compute the flexural stresses for different load cases and different cross-sections. |

UNIT-I

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial systems- Analysis of trusses by Method of Joints & Sections- Friction:Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions - Motion of Bodies.

UNIT-II

Centroid and Center of Gravity: Introduction – Centroids of rectangular, circular, I, L and T sections - Centroids of built-up sections. Area moment of Inertia: Introduction – Definition of Moment of Inertia of rectangular, circular, I, L and T sections - Radius of gyration. Moments of Inertia of

Composite sections.

UNIT – III

Simple Stresses and Strains:

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 – IV

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 over hanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – point of contra flexure – Relation between S.F, B.M and rate of loading at section of a beam.

UNIT – V

Flexural Stresses:

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

TEXT BOOKS:

1. R.K Bansal, Engineering Mechanics, Lakshmi Publications.
2. R. Subramanian, Strength of Materials, Oxford University Press.

REFERENCES:

1. Shesagiri Rao, Engineering Mechanics, Universities Press, Hyderabad.
2. S. Timoshenko, D.H. Young and J.V. Rao, Engineering Mechanics, Tata McGraw-Hill Company.
3. R. K. Bansal, Strength of Materials, Lakshmi Publications House Pvt. Ltd.
4. Sadhu Singh, Strength of Materials, Khanna Publishers 11th edition 2015.

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B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|--------------------------------|---|---|---|---|
| | Communicative English I | 2 | 0 | 0 | 2 |

SEMESTER-I

Course Objectives:

The objectives of this course are:

| | |
|-----------|---|
| 1. | Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers |
| 2 | Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials |
| 3 | Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations |
| 4 | Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information |
| 5 | Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing |

Course Outcomes (CO):

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English |
| 2 | Apply grammatical structures to formulate sentences and correct word forms |
| 3 | Analyze discourse markers to speak clearly on a specific topic in informal discussions |
| 4 | Evaluate reading/listening texts and to write summaries based on global comprehension of these texts. |
| 5 | Create a coherent paragraph interpreting a figure/graph/chart/table |

Unit 1

Lesson: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information. Reading for Writing :Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph. Grammar and

Vocabulary: Content words and function words; word forms: verbs, nouns, adjectives and adverbs;

nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Learning Outcomes

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

Unit 2

Lesson: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks. Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Learning Outcomes

At the end of the module, the learners will be able to
comprehend short talks on general topics
participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
understand the use of cohesive devices for better reading comprehension
write well structured paragraphs on specific topics
identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit 3

Lesson: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to. Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed. Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. Grammar and Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Learning Outcomes

At the end of the module, the learners will be able to
comprehend short talks and summarize the content with clarity and precision
participate in informal discussions and report what is discussed
infer meanings of unfamiliar words using contextual clues
write summaries based on global comprehension of reading/listening texts
use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit4

Lesson: Innovation: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without

video; listening with video. Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data. Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables. Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Learning Outcomes

At the end of the module, the learners will be able to
infer and predict about content of spoken discourse
understand verbal and non-verbal features of communication and hold formal/informal conversations
interpret graphic elements used in academic texts
produce a coherent paragraph interpreting a figure/graph/chart/table
use language appropriate for description and interpretation of graphical elements

Unit 5

Lesson: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides. Reading: Reading for comprehension. Writing: Writing structured essays on specific topics using suitable claims and evidences. Grammar and Vocabulary: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes

At the end of the module, the learners will be able to
take notes while listening to a talk/lecture and make use of them to answer questions
make formal oral presentations using effective strategies
comprehend, discuss and respond to academic texts orally and in writing
produce a well-organized essay with adequate support and detail
edit short texts by correcting common errors

Prescribed Text:

Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan

Reference Books

Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking*. Heinley ELT; 2nd Edition, 2018.
Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
Oxford Learners Dictionary, 12th Edition, 2011

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B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|---|---|---|---|---|
| | Differential equations and vector calculus | 3 | 0 | 0 | 3 |

SEMESTER-II

Course Objectives:

The objectives of this course are:

| | |
|-----------|--|
| 1. | This course will illuminate the students in the concepts of differential equations and vector calculus |
| 2. | To equip the students with standard concepts and tools to develop the confidence and ability to handle various real world problems and their applications. |

Course Outcomes (CO):

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Acquire knowledge in finding the solution of higher order linear differential equations, partial differential equations, vector differentiation and integration of vector functions.. |
| 2 | Develop skills in problem solving of the differential equation, properties of oscillatory electrical circuits and heat transfer in engineering systems, partial differential equations through different evaluation methods. |
| 3 | Develop skills in designing mathematical models involving R – C and L – C – R oscillatory electrical circuits, mechanical oscillation, deflection of beams, engineering concepts involving lengths of curves and areas of planes, flux across surfaces. |
| 4 | Develop analytical skills in providing solutions for complex problems non homogeneous linear differential equations, oscillatory electrical circuits, partial differential equations, vector differentiation involving and integrations |
| 5 | Applications of differential equations and vector calculus to solve engineering problems |

UNIT 1: Linear differential equations of higher order

8hrs

Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral, method of variation of parameters.

UNIT 2: Applications of Linear Differential Equations

8hrs

Cauchy's and Legendre's linear equations, simultaneous linear equations with constant coefficients, Applications to L-C-R Circuit problems and Mass spring system.

UNIT 3: Partial Differential Equations**8 hrs**

First order partial differential equations, solutions of first order linear and non-linear PDEs.

Solutions to homogenous and non-homogenous higher order linear partial differential equations.

UNIT4: Vector differentiation**8hrs**

Scalar and vector point functions, vector operator ∇ , ∇ applies to scalar point functions-Gradient, ∇ applied to vector point functions-Divergence and Curl, vector identities.

UNIT 5: Vector integration**8hrs**

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and applications of these theorems.

Textbooks:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

References:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
5. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
6. Michael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson edn
7. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
8. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
9. R.L. Garg Nishu Gupta, Engineering Mathematics Volumes-I & II, Pearson Education
10. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
11. H. k Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand..

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B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|----------------------------|---|---|---|---|
| | ENGINEERING PHYSICS | 2 | 1 | 0 | 3 |

SEMESTER-II

Course Objectives:

The objectives of this course are:

| | |
|----|---|
| 1. | To make a bridge between the physics in school and engineering courses. |
| 2. | To familiarize the concepts of theoretical acoustics to practical use in engineering field. To explain the significance of ultrasound and its application in NDT for diversified engineering application. |
| 3 | Understand the basic concepts of mechanics and oscillations in correlation to |
| 4 | To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibres along with engineering applications. |
| 5 | To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications. |
| 6 | To open new avenues of knowledge in dielectric and magnetic materials which find potential in the emerging micro device applications.
Considering the significance of micro miniaturization of electronic devices and significance of low dimensional materials, the basic concepts of nano materials, their properties and applications in modern emerging technologies are elicited. |

Course Outcomes (CO):

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Identify forces and moments in mechanical systems using scalar and vector techniques (L3). Interpret the equation of motion of a rigid rotating body (torque on a rigid body), Simple harmonic oscillators, Damped harmonic oscillator, Heavy, Forced oscillations, Resonance for consideration in designing technological applications. (L3) |
| 2 | Explain sound waves and its propagation /interaction with construction material in design of buildings (L2). Analyze acoustic parameters of typically used materials in buildings (L4). Recognize sound level disruptors and their application in architectural acoustics (L2). Identify the use of ultrasonics in diversified fields of engineering (L3) |
| 3 | Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). |

| | |
|---|---|
| | Classify optical fibers based on refractive index profile and mode of propagation (L2).
Identify the applications of optical fibers in medical, communication and other fields(L2).
Apply the fiber optic concepts in various fields (L3). |
| 4 | Explain the need of coherent sources and the conditions for sustained interference (L2).
Identify applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary polarized light and extraordinary polarized light (L2)
The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics. |
| 5 | Explain the concept of dielectric constant and polarization in dielectric materials (L2).
Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius- Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)
Identify the nano size dependent properties of nanomaterials (L2). Illustrate the methods for the synthesis and characterization of nanomaterials (L2). Apply the basic properties of nanomaterials in various Engineering branches (L3). |

Unit-1: Introduction to Mechanics and Oscillations

Introduction to Mechanics and Oscillations-Basic laws of vectors and scalars-Rotational frames-Conservative forces – $F = -\text{grad } V$, torque and angular momentum – Simple harmonic oscillators-Damped harmonic oscillator-Heavy, critical and under damping- Energy decay in damped harmonic oscillator- Forced oscillations – Resonance.

Unit-II: Acoustics and Ultrasonics

Acoustics: Introduction to 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.

Ultrasonics: Introduction, Properties and Production by magnetostriction & piezoelectric methods - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C – scan displays, Medical applications

Unit-III: Lasers and Fiber optics

Lasers: Introduction – Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein’s coefficients – Population inversion – Pumping mechanisms – Nd:YAG laser – He-Ne laser – Applications of lasers.

Fiber optics- Introduction to Optical Fibers-Total Internal Reflection-Critical angle of propagation-Acceptance Angle-Numerical Aperture-Classification of fibers based on refractive index profile – Propagation of electromagnetic wave through optical fibers – Modes -Importance of V-number-Fiber optic sensors (Pressure/temperature/chemical change)

Unit-IV: Wave Optics

Interference-Principle of superposition –Interference of light – Conditions for sustained interference-interference in thin films- Colors in thin films-Newton's Rings-Determination of wavelength and refractive index.

Diffraction-Introduction-Fresnel and Fraunhofer diffraction-Fraunhofer diffraction due to single slit and double slit – Diffraction grating- Grating spectra.

Polarization-Polarization by double refraction-Nicol's Prism--Half wave and Quarter wave plates-Engineering applications of Polarization.

UNIT V:Engineering Materials

Dielectric Materials: Introduction-Dielectric polarization- Dielectric constant- Types of polarizations: Electronic and Ionic, Orientation Polarizations (Qualitative) - Lorentz (Internal) field-Clausius-Mossottiequation-Applications of Dielectrics: Ferroelectricity and Piezoelectricity.

Magnetic Materials: Introduction-Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Hysteresis - Soft and hard magnetic materials-Applications.

Nanomaterials: Introduction – Surface area and quantum confinement –Physical properties: electrical and magnetic properties- Synthesis of nanomaterials: Top-down: Ball Milling, Bottom-up: Chemical Vapour Deposition – Applications of nanomaterials.

Prescribed Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu& Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering physics – D.K. Battacharya and Poonam Tandon, Oxford University press.

Reference Books:

Introduction to modern optics – Grant R Fowles

A text book on Optics – Brijlal& Subramanyam

Laser Fundamentals – William T. Silfvast, Cambridge University Press

Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley

& SonsIntroduction to Nanotechnology – C P Poole and F J Owens, Wiley

Hand Book of Non-destructive evaluation, C.J.Hellier, McGraw-

Hill Engineering Physics – K.Thyagarajan, MacGraw Hill

Publishers Engineering Physics – M.R.Srinivasan, New Age

Publications Engineering Physics – D K Pandey, S. Chaturvedi,

Cengage Learning

Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|--|---|---|---|---|
| | BUILDING MATERIALS AND CONSTRUCTION | 3 | 1 | 0 | 4 |

SEMESTER-II

Course Objectives:

The objectives of this course are:

| | |
|-----------|---|
| 1. | To give the students a basic idea about the traditional and modern construction materials a brief knowledge on building components and its construction methodologies |
|-----------|---|

Course Outcomes (CO):

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Identify and characterize the properties of various building materials. |
| 2 | Understand the modern building materials, properties and their uses |
| 3 | Understand the importance of insulating materials in building construction. |
| 4 | Understand the importance of building structural components and its services. |
| 5 | Understand the principles and methods of construction of building components |

UNIT – I

INTRODUCTION TO BUILDING MATERIALS

Traditional & Organic Building Materials – Stone – Dressing of Stones – Modern Building Materials – Bricks – Manufacturing process – Ceramic Products – Manufacturing Process – Building Materials for Low Cost Housing – Utilisation of Wastes for Alternative Building Materials – Sustainable Materials in Construction, Concepts of energy efficient building envelopes as per ECBC – National Standards.

UNIT – II

GLASS:

Introduction to Fenestration- Functions of Glass in Buildings – Constituents and Classification of Glass – Manufacturing Process – Properties of Glass – Common Types of Glass – Special Glass – Advantages and Disadvantages of Glass – National Standards such as ECBC.

PLASTIC: Introduction – Polymerisation – Classification of Plastics – Commonly Used Plastics – Moulding and Fabricating for Plastic Products – Applications – Advantages – Disadvantages – Intelligent Use of Plastics in Buildings – National Standards such as ECBC.

UNIT – III

INSULATING MATERIALS

Thermal Insulating Materials: Introduction – Thermal Insulation – Heat Transfer Fundamentals –

Thermal Properties of Insulating Materials – Selection of Insulating Materials – Classification of Insulation materials – Reflective Insulation Systems – Commonly Used Building Insulation Materials – Insulation that Should not be Used – National Standards such as ECBC.

Sound Insulating Materials: Introduction – Basics of Acoustics – Sound Absorption or Insulation – Green Insulation – Cool Roof, Green Roof, Power Roof – National Standards such as ECBC.

UNIT – IV

STRUCTURAL COMPONENTS:–

Foundations – classification of Foundations – consideration in selection of foundation types – Masonry – Brick and block walls – Cavity walls – Damp-proof courses and membranes – Mortars – Arches and openings – Windows – Glass and glazing – Doors – Stairs – Types and Applications – Cladding to external walls – Flat roofs – Dormer windows – Formwork & Scaffolding – Precast concrete frames – Portal frames – Types – components – Framed structures – Components – Construction Procedure – Panel walls – National Standards such as ECBC.

UNIT – V

INTERNAL CONSTRUCTION AND FINISHES

Internal elements – Internal walls – Construction joints – Internal walls, fire protection – separating walls – Partitions – Plasters and plastering – Domestic floors and finishes – Sound insulation – Timber, concrete and metal stairs – Internal doors – Door sets – Fire resisting doors – Plasterboard ceilings – Suspended ceilings – Paints and painting – Components of Paints – Types of Paint – Considerations in Selecting Paints – Cement Paints – Oil Paints – Emulsion Paints – Whitewash and Colourwash – Application of Paints – Distempers – Varnishes – Safety – Joinery production – Composite boarding – National Standards such as ECBC.

TEXT BOOKS:

1. Building Material by S K Duggal – New Age International Publishers; Second Edition
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi
3. A Textbook on Building Construction by S.K.Sharma, S.ChandPubilishers.
4. Building Materials by M.L.Gambhir, TMH Pubilishers.
5. ECBC (Energy Conservation Building Code).

REFERENCES:

1. Building construction by W.B.Mckay, Vol.I, II, III & IV Pearson Publications, 2013 edition.
2. R.Chudly –Construction Technology – Volumes I and II 2nd Edition, Longman, UK, 1987.
3. Building materials by S.C.Rangawala, CharotarPubilishing House, Anand- INDIA.
4. Building Construction by S.C.Rangawala, CharotarPubilishing House, Anand- INDIA
5. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi.
6. BEE (Bureau of Energy Efficiency) Manuals on Energy efficient building envelope concepts.

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B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|----------------------------------|---|---|---|-----|
| | STRENGTH OF MATERIALS LAB | 0 | 0 | 3 | 1.5 |

SEMESTER-II

Course Objectives:

The objectives of this course are:

1. To determine the tensile strength and yield parameters of mild steel
2. To find out flexural strengths of Steel/Wood specimens and measure deflections
3. To determine the torsion parameters of mild steel bar
4. To determine the hardness numbers, impact and shear strengths of metals
5. To determine the load-deflection parameters for springs

Course Outcomes (CO):

On Completion of the course, the students will be able to:

1. Conduct tensile strength test and draw stress-strain diagrams for ductile metals
2. Perform bending test and determine load-deflection curve of steel/wood
3. Able to conduct torsion test and determine torsion parameters
4. Perform hardness, impact and shear strength tests and calculate hardness numbers, impact and shear strengths
5. Able to conduct tests on closely coiled and open coiled springs and calculate deflections

LIST OF EXERCISES:

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

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B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|-----------------------------------|---|---|---|-----|
| | Civil Engineering Workshop | 0 | 0 | 3 | 1.5 |

SEMESTER-II

Course Objectives

The student will be able

1. To analyze the plan and carry out setting out of building with the help of tape and cross staff
2. To construct brick wall of English bond with different thickness
3. To determine the centre of gravity & moment of inertia of rolled steel sections by actual measurements
4. To successfully apply the various finishing works onto a wall
5. To successfully install various plumbing fixtures like Tap, T-Joint, Elbow, Bend, threading etc.,

LIST OF EXPERIMENTS:

- 1) Setting out of a building: The student should set out a building (single room only) as per the given building plan using tape only.
- 2) Setting out of a building: The student should set out a building (single room only) as per the given building plan using tape and cross staff.
- 3) Construct a wall of height 50 cm and wall thickness 1½ bricks using English bond (No mortar required) - corner portion – length of side walls 60 cm.
- 4) Construct a wall of height 50 cm and wall thickness 2 bricks using English bond (No mortar required) - corner portion – length of side walls 60 cm.
- 5) Computation of Centre of gravity and Moment of inertia of a given rolled steel section by actual measurements.
- 6) Installation of plumbing and fixtures like Tap, T-Joint, Elbow, Bend, Threading etc;
- 7) Plastering and Finishing of wall
- 8) Application of wall putty and painting a wall
- 9) Application of base coat and laying of Tile flooring of one square meter
- 10) Preparation of soil cement blocks for masonry and testing for compressive strength

11) Casting and testing of Fly ash Blocks

12) Preparation of cover blocks for providing cover to reinforcement

Course Outcomes

The student will be able to

1. Set-out a building as per the given plan using tape and cross staff
2. Construct brick wall of English bond with different thicknesses
3. Determine the center of gravity & moment of inertia of rolled steel sections by actual measurements
4. Apply the various finishing works onto a wall
5. Install various plumbing fixtures like Tap, T-Joint, Elbow, Bend, threading etc.,

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B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|----------------------------------|---|---|---|---|
| | Communicative English Lab | 0 | 0 | 2 | 1 |

SEMESTER-II

Course Objectives:

The objectives of this course are:

| | |
|-----------|---|
| 1. | students will be exposed to a variety of self instructional, learner friendly modes of language learning |
| 2 | students will cultivate the habit of reading passages from the computer monitor. Thus providing them with the required facility to face computer based competitive exams like GRE, TOEFL, and GMAT etc. |
| 3 | students will learn better pronunciation through stress, intonation and rhythm |
| 4 | students will be trained to use language effectively to face interviews, group discussions, public speaking |
| 5 | students will be initiated into greater use of the computer in resume preparation, report writing, format making etc |

Course Outcomes (CO):

On Completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills |
| 2 | Apply communication skills through various language learning activities |
| 3 | Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension. |
| 4 | Evaluate and exhibit acceptable etiquette essential in social and professional settings |
| 5 | Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English |

Unit 1

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Learning Outcomes

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

- understand different accents spoken by native speakers of English
- employ suitable strategies for skimming and scanning on monitor to get the general idea of a text and locate specific information
- learn different professional registers and specific vocabulary to describe different persons, places and objects

Unit 2

1. JAM
2. Small talks on general topics
3. Debates

Learning Outcomes

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

- produce a structured talk extemporarily
- comprehend and produce short talks on general topics
- participate in debates and speak clearly on a specific topic using suitable discourse markers

Unit 3

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building
4. **Learning Outcomes**

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

- Learn different ways of greeting and introducing oneself/others
- summarize the content with clarity and precision and take notes while listening to a talk/lecture and make use of them to answer questions
- replenish vocabulary with one word substitutes, homonyms, homophones, homographs to reduce errors in speech and writing

Unit 4

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Learning Outcomes

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

- Learn different ways of asking information and giving directions
- Able to transfer information effectively
- understand non-verbal features of communication

Unit 5

Oral Presentations

Précis Writing and Paraphrasing

Reading Comprehension and spotting errors

Learning Outcomes : At the end of the module, the learners will be able to

- make formal oral presentations using effective strategies
- learn different techniques of précis writing and paraphrasing strategies
- comprehend while reading different texts and edit short texts by correcting common errors

Suggested Software

- Young India Films
- Walden Infotech
- Orell

Reference Books

- Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
- Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking*. Heinley ELT; 2nd Edition, 2018.

- Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
- Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012.
- A Textbook of English Phonetics for Indian Students by T.Balasubramanyam

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B.Tech (R-19 Civil Engineering)

| Course Code | Title of the Subject | L | T | P | C |
|-------------|---------------------------------------|---|---|---|-----|
| | ENGINEERING PHYSICS LABORATORY | 0 | 0 | 3 | 1.5 |

SEMESTER-II

Course Objectives: The objectives of this course are:

| | |
|-----------|--|
| 1. | To make the students gain practical knowledge to co-relate with the theoretical studies. To develop practical applications of engineering materials and use of principle in the right way to implement the modern technology |
|-----------|--|

Course Outcomes (CO):

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Operate optical instruments like microscope and spectrometer (L2) |
| 2 | Estimate the desired physical parameters by performing the concerned experiments (L2) |
| 3 | Plot the concerned physical parameter to know their related variations (L3) |
| 4 | Identify the role of various physical phenomenon in relation with the experimental concepts (L3) |

LIST OF EXPERIMENTS

Any TEN of the following experiments has to be performed during the SEMESTER

1. Laser: Determination of wavelength using diffraction grating.
2. Laser: Determination of Particle size.
3. Determination of spring constant of springs using Coupled Oscillator
4. Determination of ultrasonic velocity in liquid (Acoustic grating)
5. Determination of dielectric constant and Curie temperature of a ferroelectric material.
6. Study of B-H curve of ferromagnetic material
7. Study of variation of magnetic field along the axis of a current carrying coil - Stewart-Gee's Method
8. Rigidity modulus of material of a wire-dynamic method (Torsional pendulum)
9. Determination of numerical aperture and acceptance angle of an optical fiber.
10. Determination of thickness of thin object by wedge method.
11. Determination of radius of curvature of lens by Newton's rings.
12. Determination of wavelengths of different spectral lines of mercury spectrum using diffraction grating in normal incidence method.
13. Determination of dispersive power of the prism
14. Sonometer: Verification of the three laws of stretched strings
15. Measurement of magnetic susceptibility by Kundt's tube method.

Note: Out of 10 experiments, two experiments will be performed using virtual laboratory.

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B.Tech (R-19 Civil Engineering)
Semester-3 Syllabus

| Course Code | Title of the Subject | L | T | P | C |
|-------------|---|---|---|---|-----|
| | COMPLEX VARIABLES, TRANSFORMS & PARTIAL DIFFERENTIAL EQUATIONS | 0 | 0 | 3 | 1.5 |

Course Objectives:

The objectives of this course are:

| | |
|-----------|--|
| 1. | This course aims at providing the student to acquire the knowledge on the calculus of functions of complex variables |
| 2 | The aim is to analyze the solutions of partial differential equations. |

Course Outcomes (CO):

| | |
|----------|---|
| 1 | Acquire knowledge in <ul style="list-style-type: none"> a. Fourier series. b. Laplace transforms and their applications. c. Find the derivatives of complex functions. d. Solving Partial Differential equations e. Heat transfer and wave motion. |
| 2 | To Develop skills in analyzing the <ul style="list-style-type: none"> a. Properties of Fourier series for a given function. b. Understand the analyticity of complex functions and conformal mapping. c. Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours. d. Engineering systems & processes involving wave forms and heat transfer. Partial differential equations through different evaluation methods |
| 3 | To develop skills in designing mathematical models for <ul style="list-style-type: none"> a. Understand the usage of Laplace transforms. b. Apply Cauchy's integral theorem. c. Understand singularities of complex functions. d. Problems involving heat transfer and wave forms. |
| 4 | To develop analytical tools in solving the problems involving <ul style="list-style-type: none"> a. Fourier series b. Laplace transforms |

| | |
|---|--|
| | c.Heat transfer and wave motion.
d.Evaluate the Fourier series expansion of periodic functions. |
| 5 | Use relevant mathematical technique for evaluating

a. Evaluate improper integrals of complex functions using Residue theorem.
b. Laplace transforms
c. Solve applications of partial differential equations. |

On Completion of the course, the students will be able to:

Unit-I: Complex Variable – Differentiation:

Introduction to functions of complex variable-concept of Limit & continuity- Differentiation,Cauchy-Riemann equations, analytic functions (exponential, trigonometric, logarithm), harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method-Conformal mappings-standard and special transformations ($\sin z$, e^z , $\cos z$, z^2) Mobius transformations (bilinear) and their properties.

Unit Outcomes:

Students will be able to

- Understand functions of Complex variable and its properties.
- Find derivatives of complex functions.
- Understand the analyticity of complex functions.

Understand the conformal mappings of complex functions

Unit-II: Complex Variable – Integration:

Line integral-Contour integration, Cauchy's integral theorem, Cauchy Integral formula,Liouville's theorem (without proof) and Maximum-Modulus theorem (without proof); power series expansions: Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals (around unit circle, semi circle with $f(z)$ not having poles on real axis).

Unit Outcomes:

Students will be able to

- Understand the integration of complex functions.
- Apply Cauchy's integral theorem and Cauchy's integral formula.
- Understand singularities of complex functions.
- Evaluate improper integrals of complex functions using Residue theorem.

Unit-III: Laplace Transforms

Definition-Laplace transform of standard functions-existence of Laplace Transform – Inversetransform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function– Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function. Differentiation and integration of transform – solving Initial value problems to ordinary differential equations with constant coefficients using Laplace transforms.

Unit Outcomes:

Students will be able to

- Understand the concept of Laplace transforms and find the Laplace transforms of elementary functions.
- Find the Laplace transforms of general functions using its properties.
- Understand Laplace transforms of special functions(Unit step function, Unit Impulse &

Periodic).

- Apply Laplace transforms to solve Differential Equations.

Unit-IV: Fourier series

Determination of Fourier coefficients (Euler's) – Dirichlet conditions for the existence of Fourier series – functions having discontinuity-Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions- typical wave forms -Parseval's formula- Complex form of Fourier series.

Unit Outcomes:

Students will be able to

- Understand finding Fourier series expression of the given function.
- Determine Fourier coefficients (Euler's) and identify existence of Fourier series of the given function.
- Expand the given function in Fourier series given in Half range interval.
- Apply Fourier series to establish Identities among Euler coefficients.
- Find Fourier series of wave forms.

Unit-V: Partial Differential Equations & Applications

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of first order PDEs by Lagrange's method- Solution of non linear PDEs(Standard forms)- Solution of second order PDEs by Method of separation of variables –Solutions of one dimensional wave equation, one dimensional heat equation under initial and boundary conditions.

Unit Outcomes:

At the end of this unit, the students will be able to

- Form Partial Differential Equations.
- Solve Partial Differential Equations of first order.
- Understand the method of separation of variables.
- Solve applications of Partial Differential Equations.

Text Books:

1. B.S.Grewal , –Higher Engineering Mathematics, Khanna publishers.
2. Erwin Kreyszig, –Advanced Engineering Mathematics, Wiley India

Reference Books:

1. B.V.Ramana, –Higher Engineering Mathematics, Mc Graw Hill publishers.
2. Alan Jeffrey, –Advanced Engineering Mathematics, Elsevier.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-----------------------------------|---|---|---|---|
| | STRENGTH OF MATERIALS – II | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|--|
| 1 | To teach the student with basic concepts for determination of principal stresses and strains in various structural elements. |
| 2 | To calculate deflection in beams, column and trusses. |
| 3 | To make the student analyze circular shafts subjected to torsion. |
| 4 | To Know the effect of eccentricity of load in columns; apply failure criteria to implement in design of structural members. |
| 5 | To make the student determine critical loads for columns with different end conditions. |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand the principal stresses and principal planes. |
| 2 | Determine deflection at any point on a beam under simple and combined loads |
| 3 | Analyze members under torsion, deformation in springs |
| 4 | Understand the effect of eccentricity of load in columns and apply failure criteria to implement in design of structural members. |
| 5 | Compute the crippling load of column with different conditions |

UNIT-I

Compound Stresses and Strains:

Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, and its applications. Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain.

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

UNIT -II

Deflection of Beams:

Uniform bending – Slope, deflection and radius of curvature – Differential equation for elastic line of a beam – Double integration and Macaulay's methods. Determination of slope and deflection for cantilever and simply supported beams under point loads, U.D.L. uniformly varying load-Mohr's theorems – Moment area method – Application to simply supported and overhanging beams-

Analysis of propped cantilever beams under UDL and point loads.

UNIT -III

Torsion:

Theory of pure torsion – Assumptions and Derivation of Torsion formula for circular shaft – Torsional moment of resistance – Polar section modulus – Power transmission through shafts – Combined bending and torsion – Springs -Types of springs – Deflection of close coiled helical springs under axial pull and axial couple – Carriage or leaf springs.

UNIT -IV

Direct and Bending stresses:

Introduction-eccentric loading – Columns with eccentric loading – Symmetrical columns with eccentric loading about one axis –About two axes – Unsymmetrical columns with eccentric loading – Limit of eccentricity.

Theories of failure:

Maximum Principal stress theory- Maximum shear stress theory- Maximum strain theory- Maximum strain energy theory-Maximum distortion energy theory

UNIT -V

Columns and Struts:

Introduction – Classification of columns – Axially loaded compression members – Euler's crippling load theory – Derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Eccentric loading and Secant formula – Prof. Perry's formula.

TEXT BOOKS:

1. Mechanics of Materials – Dr.B.C.Punmia, Ashok Kumar Jain, Arun Kumar Jain, Lakshmi Publications.
2. Strength of Materials by R.K Rajput, S.Chand& Company Ltd.
3. Strength of Materials by Dr. Sadhu Singh, Khanna Publishers.

REFERENCES:

- 1) R. K. Bansal, A Text book of Strength of materials, Laxmi Publications (P) Ltd., New Delhi.
- 2) Strength of Materials, Fourth edition, S.S. Bhavikatti, Vikas Publishing House, Pvt. Ltd.
- 3) D. S. Parkas Rao Strength of Materials by, Universities Press Pvt Ltd, Hyderabad.
- 4) Schaum's outline series Strength of Materials, Mc Graw hill International Editions.
- 5) L.S. Srinath, Strength of Materials, Macmillan India Ltd., New Delhi.
- 6) S. Basavarajaiah and P. Mahadevappa, Strength of Materials in SI units, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2010

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B.Tech (R-19 Civil Engineering)
Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|------------------------|---|---|---|---|
| | FLUID MECHANICS | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|--|
| 1 | To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects. |
| 2 | To impart ability to solve engineering problems in fluid mechanics |
| 3 | To enable the students measure quantities of fluid flowing in pipes, tanks and channels |
| 4 | To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces. |
| 5 | To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses. |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand basic characteristics and behavior of fluids |
| 2 | Understand concepts of fluid statics, different equipment and their applications |
| 3 | Understand fundamentals of fluid kinematics and differentiate types of fluid flows |
| 4 | Apply Euler's and Bernoulli's equation to find the characteristics of fluid in motion |
| 5 | Apply Energy losses in pipelines and flow characteristics through closed conduits |

UNIT -I:

Basic concepts and definitions:

Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; Variation of viscosity with temperature, Newton law of viscosity; Vapor pressure, Boiling point, Surface tension, Capillarity, Bulk modulus of elasticity, Compressibility.

UNIT -II:

Fluid statics:

Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude. Piezometer , U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT -III:

Fluid kinematics:

Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three -Dimensional continuity equations in Cartesian coordinates.

UNIT -IV:

Fluid Dynamics:

Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – Derivation; Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

UNIT -V:

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series.

TEXT BOOKS:

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House
2. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi
3. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.

REFERENCES:

1. Fluid Mechanics and Hydraulic Machines, S.C.Gupta, Pearson publication
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill
3. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
4. K. Subramanya, Open Channel flow, Tata Mc.Grawhill Publishers.
6. S K SOM and G Biswas, -Introduction to Fluid Mechanics and Fluid Machines, Tata McGraw Hill, New Delhi

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU

B.Tech (R-19 Civil Engineering)

Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|----------------------|---|---|---|---|
| | SURVEYING | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | To make the student to get well conversant with the fundamentals of various basic methods and instruments of surveying. |
| 2 | To introduce to the students in identifying reduced level of the ground and its profile for finding areas and volumes of embankments and cuttings |
| 3 | To make the student to use angular measuring instruments for horizontal and vertical control. |
| 4 | To enable the student to set simple horizontal curves |
| 5 | To introduce the knowledge construction surveys and usage of modern instruments such as total station |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Calculate angles, distances and levels |
| 2 | Identify data collection methods and prepare field notes |
| 3 | Understand the working principles of survey instruments |
| 4 | understand the basics and elements of different types of curves on roads and surveying applications in setting out of curves |
| 5 | Understand modern techniques in the survey systems. |

UNIT – I

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying. Measurement of Distances and Directions Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections, indirect methods- optical methods- E.D.M. method.

Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip.

Plane table surveying: Introduction, accessories, setting up of plane table, techniques, testing, adjustments, errors, advantages and disadvantages.

UNIT - II

Levelling - Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels- HI Method-Rise and Fall method, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours.

Computation of Areas and Volumes: Areas - Determination of areas consisting of irregular boundary and regular boundary, Planimeter. Volumes - Computation of areas for level section and two level sections with and without transverse slopes, determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.

UNIT - III

Theodolite Surveying: Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Gale's traverse table, Omitted measurements.

UNIT - IV

Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry.

Curves: Types of curves and their necessity, elements of simple circular curve, setting out of simple horizontal circular curves.

UNIT - V

Construction surveys: Introduction-staking out buildings-Pipelines and sewers-Highways-Culverts. Bridge surveys-Determining the length of a bridge-Locating Centres of piers- Surface surveys and tunnel alignment-Underground surveys-connection of surface and underground surveys-Leveling in tunnels.

Total station Surveying: Basic principles, applications, comparison with conventional surveying. Electromagnetic wave theory - Electromagnetic distance measuring system - Principle of working and EDM instruments.

Text Books:

1. S.S Bhavikatti, —Surveying theory and Practicell, 2nd edition, Dreamtech press, Wiley distributors.
2. C.Venkatramaiah, -Text book of surveyingll, 2nd edition, Universities press, 2018
3. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain,-Surveyingll (Vol – 1, 2 & 3), - Laxmi Publications (P) ltd., New Delhi

References:

1. Arthur R Benton and Philip J Taety, -Elements of Plane Surveyingll, McGraw Hill – 2000.
2. Arora K R -Surveyingll Vol 1, 2 & 3, Standard Book House, Delhi, 2004.
3. Chandra A M, -Plane Surveyingll, New Age International Pvt. Ltd., New Delhi, 2002.

4. Bhavikatti –Surveying|| Vikas publishing house ltd.
5. S K Duggal, –Surveying|| (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
6. R. Agor Khanna Publishers 2015 –Surveying and leveling||.
7. R. Subramanian, –Surveying and levelling|| Oxford university press, New Delhi.
8. Chandra A M, –Higher Surveying||, New age International Pvt. Ltd., Publishers, New Delhi, 2002.
9. S.S Bhavikatti –Surveying and Levelling||, Vol. 1 and 2, Dreamtech press, Wiley distributors.
- 10 .Hoffman. B, H. Lichtenegga and J. Collins, Global Positioning System – –Theory and Practice||, Springer -Verlag Publishers, 2001.

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B.Tech (R-19 Civil Engineering)
Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|----------------------------|---|---|---|---|
| | ENGINEERING GEOLOGY | 2 | 0 | 0 | 2 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|---|---|
| 1 | Type of rocks ,civil engineering importance of rock forming minerals. |
| 2 | Geological structures, reasons of formation for each type and their side effects on the engineering projects |
| 3 | .Study ground water, factors affecting on the variation of water table depth methods of searching for ground water. |
| 4 | Study the geophysical investigation methods |
| 5 | Study the dams and geology of dam site. |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand principles of engineering geology. |
| 2 | Understand properties of various rocks and minerals |
| 3 | Understand the suitability of sites for various civil engineering structures |
| 4 | Understand geological strata in the analysis and design the civil engineering structures. |
| 5 | Understand the concept of remote sensing and GIS |

UNIT – I

INTRODUCTION:

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

WEATHERING OF ROCKS: Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like –Granite||

MINERALOGY:

Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar , Quartz , Flint , Jasper, Olivine , Augite , Hornblende , Muscovite , Biotite , Asbestos, Chlorite , Kyanite , Garnet, Talc , Calcite. Study of other

common economic minerals such as Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

UNIT – II

PETROLOGY:

Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of Igneous. Sedimentary and Metamorphic rocks. Their distinguishing features, Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

STRUCTURAL GEOLOGY:

Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults and conformities, and joints – their important types. Their importance In situ and drift soils, common types of soils, their origin and occurrence in India

UNIT – III

GROUND WATER, EARTH QUAKE & LAND SLIDES:-

Groundwater, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and land slides.

UNIT –IV

GEOPHYSICAL STUDIES:-

Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc.

UNIT – V

GEOLOGY OF DAMS, RESERVOIRS AND TUNNELS:

Types of dams and importance of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water Longevity and life of reservoirs. Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (

ie. Lithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:

- 1) Engineering Geology by N.Chennakesavulu, Mc-Millan, India Ltd. 2005
- 2) Engineering geology by Duggal, TMH Publishers.
- 3) Engineering Geology by Vasudev Kanthi, Universities press, Hyderabad.

REFERENCES:

1. Engineering geology by Prabinsingh, Katson Publications
2. Engineering Geology by Subinoy Gangopadhyay, Oxford University press.
3. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications
4. K. S. Valdiya, — Environmental Geology, Tata Mc Graw Hills.

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B.Tech (R-19 Civil Engineering)
Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------|---|---|---|---|
| | STRUCTURAL ANALYSIS – I | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | Ability to understand the concepts of energy theorems. |
| 2 | Ability to analyse whether a structures is statically determinate or in-determinates. |
| 3 | Ability to analyse indeterminate structure with yielding of supports |
| 4 | Ability to Analyze the beams and frames by using slope deflection distribution method |
| 5 | Ability to Analyze the beams and frames by using moment distribution method |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|-----|--|
| CO1 | Apply energy theorems for analysis of indeterminate structures |
| CO2 | Analyse whether a structures is statically determinate or in-determinates. |
| CO3 | Analyze indeterminate structure with yielding of supports |
| CO4 | Analyze the beams and frames by using slope deflection distribution method |
| CO5 | Analyze the beams and frames by using moment distribution method |

UNIT – I

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 – II

ANALYSIS OF INDETERMINATE STRUCTURES: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with upto two degrees of internal and external indeterminacies – Castigliano's theorem.

UNIT – III

FIXED BEAMS & CONTINUOUS BEAMS : Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT – IV

SLOPE-DEFLECTION METHOD: Introduction-derivation of slope deflection equations-application to continuous beams with and without settlement of supports - Analysis of single bay portal frames without sway

UNIT – V

MOMENT DISTRIBUTION METHOD: Introduction to moment distribution method-Application to continuous beams with and without settlement of supports-Analysis of single bay storey portal frames without sway.

TEXT BOOKS:

- (1) Analysis of Structures – Vol-I&II by V.N.Vazirani&M.M.Ratwani, Khanna Publications, New Delhi.
- (2) Structural Analysis by S SBhavikatti – Vikas Publishing House.
- (3) Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi.

REFERENCES :

- (1) Structural analysis – Hibbler – Pearson education
- (2) Introduction to structural analysis by B.D.Nautiyal, New Age international publishers, New Delhi.
- (3) Structural Analysis – D.S.Prakasarao - Univeristy press.
- (4) Introduction To Structural Analysis-Nautial- New Age Pubilishers
- (5) Strength of Materials and Mechanics of Structures by B.C.Punmia, Khanna Publications, NewDelhi.
- (6) Structual analysis Vol.I and II by Dr.R.Vaidyanathan and Dr.P Perumal – Laxmi publications.
- (7) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.

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B.Tech (R-19 Civil Engineering)

Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|----------------------|---|---|---|-----|
| | SURVEYING LAB | 0 | 0 | 3 | 1.5 |

Course Objectives :

1. To find the area of a given boundary through Plane Table Survey and solve two point problem
2. To determine the RLs of different points through fly leveling
3. To draw longitudinal and cross sections of Road profile
4. To determine the horizontal & vertical angles with a Theodolite and find heights and distances via Tachometry
5. To determine areas and remote heights using total station traversing

List of Experiment :

- Setting up of Right angles using cross staff
- Plane table survey; finding the area of a given boundary
- Two Point Problem by the plane table survey.
- Fly leveling: Height of the instrument method and rise and fall method.
- Fly leveling: Longitudinal Section and Cross sections of a given road profile.
- Theodolite Survey: Determining the Horizontal and Vertical Angles
- Finding the distance between two inaccessible points using Theodolite
- Tachometric survey: Heights and distance problems using tachometric principles.
- One Exercise on Curve setting.
- Total Station Determination of area using total station. Traversing and Contouring
- Total Station: Determination of Remote height.
- Developing a Contour map

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| |
|--|
| 1. Conduct Plane Table Survey and determine areas and be able to solve two point problem |
| 2. Perform fly leveling and determine RLs of different locations and draw contour maps |
| 3. Able to use fly Levels and draw Longitudinal and Cross section profiles of Roads |
| 4. Perform Theodolite survey and measure horizontal & vertical angles and compute heights and distances through Tachometry |
| 5. Able to handle Total Station for complete survey of a given Topography |

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B.Tech (R-19 Civil Engineering)
Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------|---|---|---|-----|
| | ENGINEERING GEOLOGY LAB | 0 | 0 | 3 | 1.5 |

COURSE OBJECTIVES

The objectives of this course are:

| |
|---|
| 1. Enable the students to understand physical properties of minerals and identify the same |
| 2. Familiarize the students with different igneous rocks & their properties and enable them to identify igneous rocks |
| 3. Familiarize the students with different sedimentary rocks & their properties and enable them to identify such sedimentary rocks |
| 4. Teach physical properties of different metamorphic rocks & their properties and enable them with skills to identify metamorphic rocks. |
| 5. Drawing sections for geological maps showing tilted beds, faults, uniformities etc., and solve Simple Structural Geology problems. |

COURSE OUTCOMES

| |
|---|
| 1. Identify the minerals based on their physical properties by simple tests |
| 2. Understand the physical properties of igneous, sedimentary and metamorphic rocks |
| 3. Classify rocks using basic geologic classification systems. |
| 4. Interpret the geological structures in the geological maps and sections. |
| 5. Solve various geological problems involving strike and Dip. |

LAB EXAMINATION PATTERN:

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

Text Books:-

1. Elementary Exercises in Geology by CVRK Prasad, Universities press.
2. B.S.Satyanarayana Swamy, Engineering Geology Laboratory Manual , Dhanpat Rai Sons, New Delhi

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B.Tech (R-19 Civil Engineering)

Semester-3 Syllabus

| SubjectCode | TitleoftheSubject | L | T | P | C |
|-------------|-------------------------------|---|---|---|-----|
| | Exploratory Data Analysis Lab | 0 | 0 | 3 | 1.5 |

COURSEDESCRIPTION: Statistical and Numerical Techniques– Measures of central tendency/dispersion, Curve fitting by method of least squares, linear regression and correlation, ANOVA; Data analysis using R, Numerical Solution of algebraic, transcendental and ordinary differential equations ,Inverse and Eigen values of a matrix– Numerical method.

CEO 1: To impart knowledge on the application of Statistical and Numerical techniques – Analysis of data, solution of algebraic, transcendental and differential equations, Matrices, transformation from time domain to frequency domain.

CEO 2: To develop skills in analyzing the data using appropriate statistical tools, solving algebraic and differential equations, matrices using appropriate numerical methods, obtaining amplitude and frequency of a time signal

COURSE OUTCOMES: After completion of the course, a successful

student is able to

CO1 : Develop skills in designing appropriate statistical method for

- (a) Determining the measures of central tendency/dispersion.
- (b) Box plot representation using Origin Software.
- (c) Finding a best fit curve to a given set of data.
- (d) Determining the coefficient of correlation and linear regression.

CO2: Develop skills in using suitable statistical technique for

- (a) Analyzing variance(ANOVA) for one variable.
- (b) Determination of R function for a given set of data and appropriate interpretation.
- (c) Representing three dimensional data in contour plot using MATLAB.

CO 3 : Transform a time signal / pulse to a frequency domain using concepts of Fourier series

CO 4 : Develop skills using suitable numerical technique for

- (a) Solving algebraic ,transcendental and differential equations.
- (b) Determining Eigen Values and dominant Eigen value of a matrix.

LISTOFEXPERIMENTS

Required softwares :SPSS,ORIGIN, MATLAB,R-LAB,MSOFFICE2010.

I. Statistical and Fourier series Techniques:

To a given set of data:

1. Determine measures of central tendency/dispersion - Mean, Median, Mode, Range and Variance; Box plot representation using Origin Software.
2. Fit a straight line, parabola, exponential curve.
3. Determine the coefficient of correlation and regression.
4. Analysis of variance(ANOVA)for one variable.
5. Determine R function and give interpretation.
6. Transforming signal in time domain into frequency domain.
7. Represent in contour plot using MATLAB.

II. Numerical Techniques:

8. Solving algebraic and transcendental equations using Regula - Falsi and Newton – Raphson methods.
9. Determine the inverse of a matrix; solving system of algebraic equations using Gauss-Siedal method.
10. Determine the Eigen values of a matrix and dominant Eigen value by power method.
11. Numerical differentiation and integration.
12. Numerical solution of Ordinary differential equations - Modified Euler method & R-K fourth order method.

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Semester-3 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|---------------------|------------------------------|----------|----------|----------|----------|
| - | Environmental Science | 3 | 0 | 0 | 0 |

OBJECTIVE: 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: 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 following ecosystem:

- a. Forest ecosystem.
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION :Introduction 0 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: Definition, Cause, effects and control measures of :

- a. Air Pollution.
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

Department of Chemical Engineering R15

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: 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: 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..

TEXT BOOKS :

- (1) Text book of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission, Universities Press.
- (2) Environmental Studies by Palaniswamy – Pearson education
- (3) Environmental Studies by Dr.S.AzeemUnnisa, Academic Publishing Company

REFERENCES :

- (1) Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.
- (2) Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
- (3) Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
- (4) Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
- (5) A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Publishing House
- (6) Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---------------------------------|---|---|---|---|
| | STRUCTURAL ANALYSIS – II | 2 | 1 | 0 | 3 |

COURSE OBJECTIVE:

The objectives of this course are:

| | |
|---|---|
| 1 | Ability the behaviour of arches and their methods of analysis |
| 2 | To ability various classical methods for analysis of indeterminate structures |
| 3 | Ability to Analyze the beams and frames using Kani's method |
| 4 | To ability Analyze the beams and frames by using Flexibility Matrix method |
| 5 | Ability to Analyze the beams and frames by using Stiffness Matrix method |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Demonstrate the behaviour of arches and their methods of analysis |
| 2 | Analyze the frames by moment distribution method and substitute frame analysis |
| 3 | Analyze the beams and frames using Kani's method |
| 4 | Analyze the beams and frames by using Flexibility Matrix method |
| 5 | Analyze the beams and frames by using Stiffness Matrix method |

UNIT I

ARCHES : Three hinged and Two hinged arches, Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature-Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses.

UNIT-II

MOMENT DISTRIBUTION METHOD FOR FRAMES:-Analysis of single bay single storey portal frame including side sway –Substitute frame analysis by two cycle method.

UNIT – III

KANT'S METHOD:-

Analysis of continuous beams with and without settlement of supports -Single bay single storey portal frames with and without side sway.

UNIT – IV

FLEXIBILITY METHOD :-

Flexibility methods- Introduction- Application to continuous beams including support settlements— Analysis of Single bay single storey portal frames without and with side sway.

UNIT – V

STIFFNESS METHOD:

Stiffness methods- Introduction-application to continuous beams including support settlements- Analysis of Single bay single storey portal frames without and with side sway.

TEXT BOOKS:

1. Analysis of structures by Vazrani&Ratwani – Khanna Publications.
2. Theory of structures by Ramamuratham, jain book depot , New Delhi.

REFERENCES :

1. Structural analysis by R.S.Khurmi, S.Chand Publications, New Delhi.
2. Basic Structural Analysis by K.U.Muthuet *al.*, I.K. International Publishing House Pvt.Ltd
3. Theory of Structures by Gupta S P, G S Pundit and R Gupta, Vol II, Tata McGrawHill Publications company Ltd.
4. D S Prakash Rao, “**Structural Analysis: A Unified Approach**”, Universities Press

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------------|---|---|---|---|
| | Building Planning and Drawing | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | Understand basic principles of building design and planning. |
| 2 | Comprehend local building bye-laws and provisions of National Building Code in respect of building and town planning |
| 3 | They will explore building drawing as a way of discovering and developing ideas for designing residential , commercial and public buildings. |
| 4 | The student develops basic drawing skills; create multilayer architectural and prepare working drawings, foundation plans and other executable drawings with proper details for residential buildings |
| 5 | Explain the principles of planning and design considerations to construct earthquake resistant building |

COURSE OUTCOMES

On Completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Apply the principles and bye-laws in planning Residential buildings |
| 2 | Understand the planning of residential building & public building |
| 3 | Understand the safety and comforts in building |
| 4 | Interpret the symbols, signs and conventions from the given drawing. |
| 5 | Draw a line sketch and planning and bi section of a building. |

PART-A

UNIT -I

PLANING OF BUILDINGS: Types of buildings, Types of residential buildings, site selection for residential building, orientation of buildings; aspect; prospect; privacy; furniture requirement e;grouping;circulation;sanitation;lighting;ventilation;cleanliness;flexibility;elegancy;Economy; practical considerations.

BUILDING BYELAWS AND REGULATIONS: Introduction- Terminology ;Objectives of building byelaws; Minimum plot sizes; Open space requirements ;Plinth area, floor area, carpet area; Floor area ratio (FAR), Floor space Index (FSI) ;areas for different units; Principles underlying building byelaws ; built up area limitations – Height of Buildings ,Wall thickness, lighting and ventilation requirement, safety from fire, drainage and sanitation; applicability of the bye-laws.

UNIT –II

PLANNING OF RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings– Requirements of different rooms and their grouping – Characteristics of various types of residential buildings

PLANNING OF PUBLIC BUILDING: Planning of Educational institutions, Hospitals, Office buildings, Banks, Industrial buildings, Hotels and Motels, Hostels, Bus Station.

UNIT -III

BUILDINGS: SAFETY AND COMFORT: Aspects of safety-Structural, health, fire and constructional safety. Components of building automation system - HVAC, electrical lighting, Security, fire-fighting, communication etc. design for thermal comfort, ventilation comfort, air conditioning comfort, lighting comfort, noise and acoustic comfort.

PART-B

UNIT -IV

SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminum alloys etc., Lead, Zinc, tin, and white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond; odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

DOORS WINDOWS, VENTILATORS AND ROOFS: Paneled Door – Paneled and glazed door; glazed windows – Paneled windows; Swing ventilator – Fixed ventilator; Couple roof – Collar roof; Kind Post truss – Queen post truss.

UNIT –V

Given line diagram with specification to draw plan, section and elevation of the following :

1. Residential Building
2. Hospital
3. Schools
4. Post office
5. Corporate Office Building
6. Hotels
7. Bank buildings
8. Bus stations
9. Industrial buildings

FINAL EXAMINATION PATTERN: The end examination paper should consist of Part- A and Part-B. Part- A consists of three questions with either or choice from three units in planning portion .Each question carries 10 marks. Total marks for Part-A is 30 marks. Part- B consists of two questions with either or choice from drawing portion. Question from unit-IV carries 10 marks and question from unit-V carries 30 marks. Total marks for Part-B is 40 marks.

TEXT BOOKS:

1. Planning and Designing and Scheduling – Gurucharan Singh and Jagadish Singh- Standard publishers.
2. Building Planning and Design – N.Kumara Swamy and A.Kameswara Rao. Charotar publications.

REFERENCES:

1. Building by laws by state and Central Governments and Municipal corporations. National Building Code
2. Building drawing with an integrated approach to building environment-M.G.Saha, G.M.Kale, S.Y.patki-Tata Mc Graw Hill

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B.Tech (R-19 Civil Engineering)

Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | HYDRAULICS AND HYRAULIC MACHINERY | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|--|
| 1 | To Introduce concepts of laminar and turbulent flows |
| 2 | To teach principles of uniform and non-uniform flows through open channel. |
| 3 | To impart knowledge on design of turbines. |
| 4 | To impart knowledge on design of pumps. |
| 5 | To impart knowledge on design of multistage pumps |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|----|---|
| 1. | Understand characteristics of laminar and turbulent flows. |
| 2. | Understand different formulae on open channel flow and design open-channel flow systems |
| 3. | Understand the concepts of varying flow in pipes and Measure discharge and velocity |
| 4. | Understand hydrodynamic force of jets different vanes and design Pelton wheel, Francis and Kaplan turbine |
| 5. | Understand principles of centrifugal pumps and Calculate losses and efficiencies of centrifugal pumps |

UNIT -I:

Laminar & Turbulent flow in pipes:

Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Stoke's law, Measurement of viscosity. Reynolds experiment, Transition from laminar to turbulent flow. Resistance to flow of fluid in smooth and rough pipes-Moody's diagram – Introduction to boundary layer theory.

UNIT -II:

Uniform flow in Open Channels:

Open Channel Flow - Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Hydraulically efficient channel sections: Rectangular, trapezoidal and triangular channels, Energy and Momentum correction factors.

UNIT III:

Non-Uniform flow in Open Channels:

Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification - Elements and characteristics- Energy

dissipation.

UNIT -IV:

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - Velocity triangles at inlet and outlet - Work done and efficiency

Hydraulic Turbines: Classification of turbines; pelton wheel and its design. Francis turbine and its design - efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT -V:

Pumps:

Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies .

TEXT BOOKS:

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House
2. K. Subramanya, Open channel Flow, Tata McGraw Hill.

REFERENCES:

1. Rajput, Fluid mechanics and fluid machines , S. Chand & Co
2. D. S. Kumar Fluid Mechanics & Fluid Power Engineering, Kataria& Sons.
3. Srinivasan, Open channel flow by, Oxford University Press
4. Banga & Sharma, Hydraulic Machines, Khanna Publishers.
5. Fluid Mechanics and Hydraulic Machines, S.C.Gupta, Pearson publications,
6. R.K. Bansal, -A Text book of Fluid Mechanics and Hydraulic Machines, Laxmi Publications, New Delhi

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | ESTIMATION, COSTING AND VALUATION | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|----|--|
| 1. | To impart basic knowledge on different types of estimation |
| 2. | To enrich with specifications and tender procedures. |
| 3. | To give insights on various types of contract agreements. |
| 4. | To inculcate data preparation for abstract estimation |
| 5. | To teach procedure for valuation of buildings. |

Course Outcomes:

| | |
|----|--|
| 1. | Apply different types of estimates for different building elements |
| 2. | Formulate specifications and tender documents. |
| 3. | Prepare contract agreements |
| 4. | Determine rate analysis of different items. |
| 5. | Understand the Valuation of buildings. |

UNIT -I:

Estimation

Methods of estimation-advantages-types of estimates-Detailed estimates of residential buildings-Single storied and multi-storied buildings-Earthwork-foundations-Super structure-Fittings including sanitary and electrical fittings-Paintings.

UNIT -II:

Specifications and Tenders

Specifications-Detailed and general specifications-Construction specifications-sources - Types of specifications-Tender notices-types-corrigendum notice-Tender procedures Drafting model tenders.

UNIT -III:

Contracts

Types of contracts-Formation and conditions of contract-Problems-contract for labor, material, design and construction-Drafting of contract documents-Construction contracts- Arbitration and legal requirements.

UNIT -IV:

Rate Analysis and Preparation of Bills

Data-Rate analysis-abstract estimate-Report to accompany estimate-measurement book –Bills-Types

UNIT -V:

Valuation

Principles of valuation-Value and Cost-Value engineering-Value analysis-Phases in value engineering-Information-Function-escalation-Evaluation-Recommendation-Implementation-Audit.

TEXT BOOKS:

1. Dutta, B. N., -Estimating and Costing in Civil Engineering (Theory & Practice)¶, UBS Publishers, 2016
2. B. S. Patil, -Civil Engineering Contracts and Estimates¶, Universities Press Pvt Ltd, Hyderabad. 4th Edition 2015.

REFERENCES:

1. M. Chakraborti, —Estimation, Costing and Specifications¶, Laxmi publications.
2. D. D. Kohli & R. C. Kohli, -A Textbook of Estimating and Costing(Civil)¶, S. Chand and Company Limited, New Delhi
3. Standard Schedule of rates and standard data book by public works department.
4. I. S. 1200 (Parts I to XXV, -Method of Measurement of Building and Civil Engineering works – B.I.S.)¶ 1974.

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

Course Objective:

This course aims at providing the student with the knowledge on

- Various numerical methods for solving equations, interpolating the polynomials, evaluation of integral equations and solution of differential equations.
- The theory of Probability and random variables.

COURSE OUTCOMES: After completion of the course a successful student is able to

CO 1 : Acquire knowledge in basic concepts such as

- a. Number theory.
- b. Congruences and its properties.
- c. Divisibility tests.
- d. Finite fields.
- e. Cryptology.

CO 2 Develop skills in analyzing the

- a. Representation of integers and its application in computer science.
- b. Linear congruences.
- c. Pseudo primes
- d. Factorization and factor bases.
- e. Key management in cryptography.

CO 3 Develop skills in designing mathematical models for

- a. Problems on prime numbers.
- b. Linear congruences
- c. The sum and number of divisors of a given integer.
- d. Finding factorization of the given integer.
- e. Different encryption mechanisms.

CO 4 Develop analytical skills in solving the problems involving

- a. CGD, factorization of integer, linear Diophantine equations.
- b. System of linear congruences
- c. Storage and hash functions.
- d. Quadratic residues.
- e. Various public key cryptography algorithms.

CO 5 Use relevant mathematical technique for evaluating

- a. Factorization of integers.
- b. Solution for the given system of linear congruences.
- c. Cipher text using different named algorithms such as RSA, Public –key cryptography, discrete logarithm, knapsack

ciphers etc.

| Course Outcome | Program Outcomes | | | | | | | | | | | | Program Specific Outcomes | | | | |
|----------------|------------------|------|------|------|------|------|------|------|------|-------|-------|-------|---------------------------|------|------|------|------|
| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 |
| CO1 | 3 | 1 | - | - | - | 1 | - | - | 2 | 1 | - | - | | | | | |
| CO2 | 1 | 3 | - | - | - | 1 | - | - | 2 | 2 | - | - | | | | | |
| CO3 | 1 | 3 | 2 | - | - | 1 | - | - | 2 | 2 | - | - | | | | | |
| CO4 | 1 | 1 | 1 | 3 | - | 1 | - | - | 2 | 1 | - | - | | | | | |
| CO5 | 1 | 1 | 1 | 1 | - | 1 | - | - | 2 | 1 | - | - | | | | | |

Correlation Levels: High - 3

Medium – 2

Low - 1

Unit-I: Solution of Algebraic & Transcendental Equations:

Introduction-Bisection method-Iterative method-Regula falsi method-Newton Raphson method-System of Algebraic equations: Gauss Jordan method-Gauss Siedal method.

Unit Outcomes:

Students will be able to

- Calculate the roots of equation using Bisection method and Iterative method.
- Calculate the roots of equation using Regula falsi method and Newton Raphson method.
- Solve the system of algebraic equations using Gauss Jordan method and Gauss Siedal method.

Unit-II: Interpolation

Finite differences-Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

Unit Outcomes:

Students will be able to

- Understand the concept of interpolation.
- Derive interpolating polynomial using Newton's forward and backward formulae.
- Derive interpolating polynomial using Lagrange's formulae.
- Derive interpolating polynomial using Gauss forward and backward formulae.

Unit-III: Numerical Integration & Solution of Initial value problems to Ordinary differential equations

Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Modified Euler's Method-Runge-Kutta Methods.

Unit Outcomes:

Students will be able to

- Solve integral equations using Simson's 1/3 and Simson's 3/8 rule.
- Solve integral equations using Trapezoidal rule.
- Solve initial value problems to ordinary differential equations using Taylor's method.
- Solve initial value problems to ordinary differential equations using Euler's method and

Runge Kutta methods.

Unit-IV: Probability theory:

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Unit Outcomes:

Students will be able to

- Understand the concept of Probability.
- Solve problems on probability using addition law and multiplication law.
- Understand Random variables and probability mass and density functions.
- Understand statistical constants of random variables.

Unit-V: Random variables & Distributions:

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties-Uniform distribution-exponential distribution

Unit Outcomes:

Students will be able to

- Understand Probability distribution function.
- Solve problems on Binomial distribution.
- Solve problems on Poisson distribution.
- Solve problems on Normal distribution.

Text Books:

1. B.S.Grewal, "Higher Engineering Mathematics", Khanna publishers.
2. Ronald E. Walpole "Probability and Statistics for Engineers and Scientists", PNIE.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India

Reference Books:

1. B.V.Ramana, "Higher Engineering Mathematics", Mc Graw Hill publishers.
2. Alan Jeffrey, "Advanced Engineering Mathematics", Elsevier.

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------------|---|---|---|---|
| | WATER RESOURCES ENGINEERING-I | 3 | 0 | 0 | 3 |

COURSE OBJECTIVE:

The objectives of this course are:

| | |
|---|---|
| 1 | Understand the concept of hydrology and components of hydrologic cycle such as precipitation, infiltration, evaporation and transpiration |
| 2 | Quantify runoff and use concept of unit hydrograph |
| 3 | Demonstrate different methods of irrigation, methods of application of water and irrigation procedure |
| 4 | Know the concepts for analysis and design principles of storage and diversion works. |
| 5 | Learn design principles of canal structures |

COURSE OUT COMES

On Completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Understand the various processes of hydrologic cycle, measurement of rainfall and analyze the rainfall data. |
| 2 | Estimate the rainfall data from hydrograph analysis and classify the geological formation of ground water |
| 3 | Understand the process of irrigation and water requirement of crops |
| 4 | Understand various aspects related to Canal-silt theories, water logging and design of canal lining. |
| 5 | Understand the different types of cross drainage work |

UNIT – I

INTRODUCTION TO HYDROLOGY: Engineering hydrology and its applications; Hydrologic cycle; precipitation- Types and forms, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, presentation and interpretation of rainfall data.

DESCRIPTIVE HYDROLOGY: Evaporation- Factors affecting evaporation, measurement of evaporation; Infiltration- Factors affecting infiltration, measurement of infiltration, infiltration indices; Run off- Factors affecting run- off, Computation of run-off; Design Flood; Estimation of maximum rate of run-off; separation of base flow.

UNIT – II

HYDROGRAPH ANALYSIS: Hydrograph; Unit Hydrograph- Construction and limitations of Unit hydrograph, Application of the unit hydrograph to the construction of a flood hydrograph resulting from rainfall of unit duration; S-hydrograph.

GROUND WATER: Introduction; Aquifer; Aquiclude; Aquifuge; aquifer parameters- porosity, Specific yield, Specific retention; Divisions of sub-surface water; Water table; Types of aquifers; storage coefficient-coefficient of permeability and transmissibility

UNIT – III

IRRIGATION: Introduction; Necessity and Importance of Irrigation; advantages and ill effects of Irrigation; types of Irrigation; methods of application of Irrigation water; quality for Irrigation

water. Duty and delta; duty at various places; relation between duty and delta; factors affecting duty; methods of improving duty.

WATER REQUIREMENT OF CROPS: Types of soils, Indian agricultural soils, preparation of land for Irrigation; soil fertility; Soil-water-plant relationship; vertical distribution of soil moisture; soil moisture tension; soil moisture stress; various soil moisture constants; Limiting soil moisture conditions; Depth and frequency of irrigation; Gross command area; Culturable command area; Culturable cultivated and uncultivated area; Kor depth and Kor period; crop seasons and crop rotation; Irrigation efficiencies; Determination of irrigation requirements of crops; Assessment of Irrigation water. Consumptive use of water-factors affecting consumptive use, direct measurement and determination by use of equations (theory only)

UNIT – IV

CHANNELS – SILT THEORIES: Classification; Canal alignment; Inundation canals; Cross-section of an irrigation channel; Balancing depth; Borrow pit; Spoil bank; Land width; Silt theories–Kennedy's theory, Kennedy's method of channel design; Drawbacks in Kennedy's theory; Lacey's regime theory- Lacey's theory applied to channel design; Defects in Lacey's theory; Comparison of Kennedy's and Lacey's theory.

WATER LOGGING AND CANAL LINING: Water logging; Effects of water logging; Causes of water logging; Remedial measures; Saline and alkaline soils and their reclamation; Losses in canal; Lining of irrigation channels – Necessity, advantages and disadvantages; Types of lining; Design of lined canal.

UNIT – V

DIVERSION HEAD WORKS: Types of diversion head works; Diversion and Storage head works; weirs and barrages; Layouts of diversion head works; components; Causes and failure of hydraulic structures on permeable foundations; Blighs creep theory; Khosla's theory; Determination of uplift pressure, impervious floors using Blighs and Khosla's theory; Exit gradient.

TEXT BOOKS:

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

REFERENCES:

1. Engineering Hydrology by K. Subramanya, The Tata McGraw Hill Company, Delhi
2. Engineering Hydrology by Jayarami Reddy, Laxmi publications pvt. Ltd., New Delhi
3. Irrigation and Water Resources & Water Power by P.N. Modi, Standard Book House.

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|------------------------|---|---|---|---|
| | UNIVERSAL HUMAN VALUES | 2 | 1 | 0 | 2 |

(Common to all)

Introduction:

This course discusses the role of human values in one's family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one

more semester for which the foundation course names as ||H-102 Universal Human Values 2 : -Understanding Harmony|| is designed which may be covered in their III or IV Semester.

In the Induction Program, students would get an initial exposure to human values through Universal Human Values-I. This exposure is to be augmented by this compulsory full semester foundation course.

Course Objective:

The objective of the course is four fold:

| | |
|----|---|
| 1. | Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence. |
| 2. | Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence |
| 3. | Strengthening of self-reflection. |
| 4. | Development of commitment and courage to act. |

Unit 1:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

- ☐ Purpose and motivation for the course, recapitulation from Universal Human Values-I
- ☐ Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
- ☐ Continuous Happiness and Prosperity- A look at basic Human Aspirations
- ☐ Right understanding, Relationship and Physical Facility- the basic requirements for

fulfilment of aspirations of every human being with their correct priority

- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

Unit 2:

Understanding Harmony in the Human Being - Harmony in Myself!

- Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
- Understanding the needs of Self (‘I’) and ‘Body’ - happiness and physical facility
- Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

Unit 3:

Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
- Understanding the meaning of Trust; Difference between intention and competence
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students’ lives

Unit 4:

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature
- Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film –Homelife can be used), pollution, depletion of resources and role of technology etc.

Unit 5:

Implications of the above Holistic Understanding of Harmony on Professional Ethics

- ☐ Natural acceptance of human values
- ☐ Definitiveness of Ethical Human Conduct
- ☐ Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- ☐ Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- ☐ Case studies of typical holistic technologies, management models and production systems

- ☐ Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations
- ☐ Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Book

1. R R Gaur, R Asthana, G P Bagaria, –A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. R R Gaur, R Asthana, G P Bagaria, –Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. A.N.Tripathi, –HumanValues, NewAgeIntl.Publishers, NewDelhi, 2004.
3. The Story of Stuff(Book).
4. MohandasKaramchandGandhi –TheStoryofMyExperimentswithTruth
5. E. F.Schumacher. –Small is Beautiful
6. Slow is Beautiful –Cecile Andrews
7. J C Kumarappa –Economy of Permanence
8. PanditSunderlal–Bharat Mein Angreji Raj
9. Dharampal, –Rediscovering India
10. Mohandas K.Gandhi, –Hind Swaraj or Indian Home Rule
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland(English)
13. Gandhi - Romain Rolland (English)

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|---------------------|------------------------------------|----------|----------|----------|----------|
| - | Computer Aided Drafting Lab | 0 | 0 | 3 | 1.5 |

Course outcome / Course Objectives:

1. After completion of the course A student will able to know how to apply engineering drawing using computers
2. A student can understand about the scope of Auto CAD software
3. A student will know what is plan and how it should drawn in auto CAD software.

LIST OF EXERCISES:

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different software_s
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software for Single storied buildings
5. Drawing of plans of buildings using software for multi storied buildings
6. Developing sections and elevations for Single storied buildings
7. Developing sections and elevations for multi storied buildings
8. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD software
9. Exercises on development of working of buildings

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|-----|
| | FLUID MECHANICS AND HYDRAULIC MACHINERY LAB | 0 | 0 | 3 | 1.5 |

Course Objective:

By the end of this course student will be able

1. To determine coefficient of discharge for Venturimeter and orifice meter.
2. To determine coefficient of discharge for small orifice and mouth piece
3. To determine discharge co-efficient of Notches
4. To determine the efficiency of Pelton wheel Turbine and centrifugal pump
5. To evaluate impact of jets on vanes in different angles

| COURSE OUTCOMES | |
|------------------------|---|
| CO1 | 1. Perform flow tests and determine coefficient of discharge for venturimeter and orifice meters |
| CO2 | 2. Conduct flow tests and determine Coefficient of discharge for a small orifice and external mouthpiece. |
| CO3 | 3. Perform tests on rectangular & triangular notches and evaluate flow regimes |
| CO4 | 4. Evaluate the efficiency of Pelton wheel turbine and centrifugal pumps |
| CO5 | 5. Conduct impact of jets test on Vanes located in different angles and draw velocity triangles |

SYLLABUS:

1. Calibration of Venturimeter
2. Calibration of Orifice meter
3. Determination of Coefficient of discharge for a small orifice by a constant head method.
4. Determination of Coefficient of discharge for an external mouth piece by variable head method.
5. Calibration of contracted Rectangular Notch and /or Triangular Notch.
6. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
7. Verification of Bernoulli's equation.

8. Impact of jet on vanes.
9. Study of Hydraulic jump.
10. Performance test on Pelton wheel turbine.
11. Performance test on Francis turbine.
12. Efficiency test on centrifugal pump.

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Semester-4 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|------------------------------|---|---|---|---|
| | BIOLOGY FOR ENGINEERS | 3 | 0 | 0 | 0 |

Course Objectives: To provide basic understanding about life and life Process. Animal and plant systems. To understand what biomolecules are, their structures and functions. Application of certain biomolecules in Industry.

| | |
|---|--|
| 1 | Brief introduction about human physiology and bioengineering. |
| 2 | To understand hereditary units, i.e. DNA (genes) and RNA and their synthesis in living organism. |
| 3 | How biology Principles can be applied in our daily life using different technologies. |
| 4 | Brief introduction to the production of transgenic microbes, Plants and animals. |

Course Outcomes:

After studying the course, the student will be able to:

| | |
|---|---|
| 1 | Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms. |
| 2 | Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry. |
| 3 | Briefly about human physiology. |
| 4 | Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms. |
| 5 | Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals. |

Unit I: Introduction to Basic Biology

Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes. Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Brief introduction to five kingdoms of classification.

Unit Outcomes:

After completing this unit, the student will be able to

- Summarize the basis of life. (L1)
- Understand the difference between lower organisms (prokaryotes) from higher organisms (eukaryotes). (L2)
- Understand how organisms are classified. (L3)

Unit II: Introduction to Bio molecules

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Unit Outcomes:

After completing this unit, the student will be able to

- Understand what are biomolecules? their role in living cells, their structure, function and how they are produced. (L1)
- Interpret the relationship between the structure and function of nucleic acids. (L2)
- Summarize the applications of enzymes in industry. (L3)
- Understand what is fermentation and its applications of fermentation in industry. (L4)

Unit III: Human Physiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Unit Outcomes:

After completing this unit, the student will be able to

- Understand what nutrients are (L1)
- Understand the mechanism and process of important human functions (L2 & L3)

Unit IV: Introduction to Molecular Biology and recombinant DNA Technology

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. DNA technology. Introduction to gene cloning.

Unit Outcomes:

After completing this unit, the student will be able to

- Understand and explain about gene structure and replication in prokaryotes and Eukaryotes (L1)
- How genetic material is replicated and also understands how RNA and proteins are synthesized. (L2)
- Understand about recombinant DNA technology and its application in different fields.(L3)
- Explain what is cloning. (L4)

Unit V: Application of Biology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Unit Outcomes:

After completing this unit, the student will be able to Understand.

- ☐ How biology is applied for production of useful products for mankind.(L1)
- ☐ What are biosensors, biochips etc. (L2)
- ☐ Understand transgenic plants and animals and their production (L3)

Text books:

1. P.K.Gupta, Cell and Molecular Biology, 5th Edition, Rastogi Publications -
2. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017

Reference Books:

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, -Biology: A Global Approach, Pearson Education Ltd, 2018.
2. T Johnson, Biology for Engineers, CRC press, 2011
3. J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2nd ed..Panima Publications. PP 434.
4. David Hames, Instant Notes in Biochemistry –2016
5. Phil Tunner, A. Mctennan, A. Bates & M. White, Instant Notes – Molecular Biology — 2014

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Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | DESIGN OF REINFORCED CONCRETE STRUCTURES | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|----|--|
| 1. | To teach the students about the design of reinforced concrete beam, column, slab, footing and retaining wall |
| 2. | To enable the students to understand the various design philosophies based on both working stress and limit state methods. |
| 3. | To enhance competence in design of reinforced concrete structures. |
| 4. | To understand the concepts of designing reinforced cement concrete structures. |
| 5. | To familiarize the students with the concepts of designing concrete mixes using different methods of proportioning and to understand the effects of various parameters |

COURSE OUTCOMES

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Classify the basic concepts of reinforced concrete analysis and design. |
| 2 | Classify the behaviour and various modes of failure of reinforced concrete members. |
| 3 | Design of Short and Long columns |
| 4 | Design of different types of footings |
| 5 | Design of slabs and staircase. |

UNIT- I:

Introduction:

Concepts of Reinforced concrete Design – Introduction to Working Stress Method - Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456:2000. **Beams:** Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections

UNIT -II:

Shear and torsion:

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;

UNIT -III:

Columns:

Short and Long columns – Under axial loads, Uniaxial bending and biaxial bending – I S Code provisions.

UNIT -IV:

Footings:

Different types of footings – Design of isolated, square, rectangular, circular footings and combined footings.

UNIT- V:

Slabs & Stair Case:

Design of one-way slab, Two-way slabs and continuous slab using I.S. Coefficients Limit state design for serviceability for deflection, cracking and codal provision. Design of doglegged staircase.

Codes/Tables: IS 456-2000 and relevant sheets (Pertaining to columns) of SP 16 Code books to be permitted into the examinations Hall.

TEXT BOOKS:

1. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, –Limit State Design, Laxmi, Publications Pvt. Ltd., New Delhi
2. P. C. Varghese, Limit state –designed of reinforced concrete, Prentice Hall of India, New Delhi

REFERENCES:

1. N. Krishna Raju, –Structural Design and Drawing, Universities Press Pvt Ltd, Hyderabad. 4th edition 2020.
2. N. C. Sinha and S. K Roy, –Fundamentals of reinforced concrete, S. Chand publishers
3. N. Subramanian, –Design of Reinforced concrete structures, Oxford university press.

IS CODE OF PRACTICE

IS 456- 2000 Code of practice for Reinforced Concrete Structures.

NOTE: Assignment on preparation of drawing sheets showing detailing of various RC Elements

All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

- Reinforcement particulars of T-beams and L-beams.
- Reinforcement detailing of continuous beams.
- Reinforcement particulars of columns and footings.
- Detailing of One way, Two way and continuous slabs

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Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|----------------------------|---|---|---|---|
| | CONCRETE TECHNOLOGY | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|--|
| 1 | To explain the functional role of ingredients of concrete and apply this knowledge to mix design philosophy |
| 2 | To develop fundamental knowledge in the fresh and hardened properties of concrete |
| 3 | To inculcate the testing methodology to evaluate the properties of concrete during fresh and hardened stage |
| 4 | To impart the knowledge on the behavior of concrete with response to stresses developed. |
| 5 | To impart the knowledge on the special concretes And design a concrete mix which fulfils the required properties for fresh and hardened concrete |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand various ingredients of concrete and their role. |
| 2 | Examine knowledge on the fresh and hardened properties of concrete. |
| 3 | Understand the long term behavior of concrete |
| 4 | Design concrete mixes using various methods. |
| 5 | Perceive special concretes for accomplishing performance levels. |

UNIT – I:

Ingredients of concrete:

Cement-Chemical composition-hydration process-Bogue's compound-Tests on properties of cement-Types of cement - I.S. Specifications. Aggregates- Classification of aggregate – Tests on properties of aggregates - characteristics of aggregate - I.S. Specifications. Water-Quality of water - Characteristics of water - I.S. Specifications. Admixtures – Classification of chemical admixtures – Properties and limitations – Classification of mineral admixtures – Properties and limitations - I.S. Specifications.

UNIT – II:

Properties of concrete:

Fresh concrete: Mixing of concrete-Workability-Factors influencing workability- Measurement of workability for conventional concrete (Slump Cone, Compaction Factor and Vee-Bee test) & SCC (V-Funnel, L-Box, U- Box, Slump Flow and J-Ring). **Hardened concrete:** Water/Cement Ratio(Abram's Law)-Gel Space Ratio-Tests on hardened concrete-Destructive Tests (Compression, Split Tensile and Flexural)-Semi Destructive Tests (Core Cutter and Pull out test) and Non

Destructive Tests (Rebound Hammer-UPV - Radiological methods) .

UNIT – III:

Elasticity, Shrinkage and Creep:

Curing of concrete -Methods of curing-Effects of improper curing-self curing-Modulus of Elasticity-Poisson's Ratio-Dynamic Modulus of Elasticity- Shrinkage and various types -Factors Affecting Shrinkage-Moisture Movement-Creep of Concrete-Factors Influencing Creep.

UNIT– IV:

Concrete Mix Design:

Proportioning of Concrete Mixes-Factors influencing - Road Note. No. 4 and IS Code Methods- IS 456 provisions on Durability-Quality Control and Statistical Methods – Mix Design of High Strength concrete (using ACI method).

UNIT – V:

Special Concretes:

Light Weight Concretes –Light Weight Aggregate Concrete- Cellular Concrete - No Fines Concrete-High Density Concrete – Fiber Reinforced Concrete-Polymer Concrete-Self Compacting Concrete and its Mix Design using EFNARC guidelines.

Text Books:

1. A. M. Neville,—Properties of Concrete, Pearson Publication – 4th Edition
2. M.S. Shetty, A. K. Jain, –Concrete Technology Theory and Practice, S. Chand and Company Limited, New Delhi

References:

1. M. L. Gambhir, –Concrete Technology, Tata Mc. Graw Hill Publishers, New Delhi
2. N. Krishna Raju, —Design of Concrete Mixes, CBS Publishers.
3. P. K. Mehta And J. M. Monteiro, –Concrete: Micro Structure, Properties and Materials, Mc-Graw Hill Publishers
4. J. Prasad, C.G.K. Nair, –Non-Destructive Test and Evaluation of Materials, Tata McGraw Hill Publishers, New Delhi

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Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|----------------------------------|---|---|---|---|
| | ENVIRONMENTAL ENGINEERING | 3 | 0 | 0 | 3 |

Course Objectives:

The objectives of this course are:

| | |
|---|--|
| 1 | To teach requirements of water and its treatment. |
| 2 | To impart knowledge on sewage treatment methodologies |
| 3 | To impart knowledge on basic concepts about sewerage system |
| 4 | To enable with design concepts of wastewater treatment UNITs |
| 5 | To throw light on importance of plumbing |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|-----|---|
| CO1 | Understand about quality of water and purification process |
| CO2 | Select appropriate technique for treatment of waste water. |
| CO3 | Estimate sewage Generation and understand the Characteristics and Composition of sewage |
| CO4 | Understand consequences of solid waste and its management |
| CO5 | Design domestic plumbing systems. |

UNIT I:

Water quality and treatment:

Water quality: Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water quality indices, water safety plans, Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system
Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes

UNIT II:

Sewage and Treatment-I

Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Small bore systems

UNIT III

Sewage and Treatment-II

Storm Water- Quantification and design of Storm water; Sewage and Sullage, Pollution due to improper disposal of sewage, National River cleaning plans, Wastewater treatment – COD & BOD-

Aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – Quality requirements for various purposes.

UNIT IV:

Solid Waste Management-

Municipal solid waste-Composition - Chemical and physical parameters - Collection, transport, treatment and disposal. waste from commercial establishments and other urban zones- Construction activities - Biomedical wastes, Effects of solid waste on environment. Disposal of solid waste- Disposal methods- Integrated solid waste management.

UNIT V:

Domestic Plumbing

Types of home plumbing systems for water supply and waste water disposal, high rise building plumbing-Pressure reducing valves, Break pressure tanks, Storage tanks, Building drainage for high rise buildings, various kinds of fixtures and fittings. Role of Government authorities in water supply, sewerage disposal.

Text Books:

1. G. S. Birdi,—Water supply and sanitary Engineering, Dhanpat Rai & Sons Publishers.
2. Peavy, H.S, Rowe, D. R. Tchobanoglous, –Environmental Engineering, Mc-Graw –Hill International Editions, New York 1985.

References:

1. B.C. Punmia, Ashok Jain & Arun Jain, –Water Supply Engineering, Vol. 1, Waste water Engineering, Vol. II, Laxmi Publications Pvt. Ltd, New Delhi.
2. MetCalf and Eddy,—Wastewater Engineering, Treatment, Disposal and Reuse, Tata McGraw-Hill, New Delhi.
3. S. M. Patil, —Plumbing Engineering Theory, Design and Practice, 1999.
4. K. N. Duggal, Elements of Environmental Engineering, S. Chand Publishers.

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Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|------------------------------------|---|---|---|---|
| | GEOTECHNICAL ENGINEERING -I | 2 | 1 | 0 | 3 |

Course Objectives:

The objectives of this course are:

| | |
|---|---|
| 1 | To enable the student to find out the index properties of the soils and their classification. |
| 2 | To enable the student to determine permeability of soils using various methods , and to understand the concept of seepage of water through soil |
| 3 | To concept of seepage of water through soil |
| 4 | To enable the students to find understand the difference between compaction and consolidation. |
| 5 | To impart knowledge on shear strength and its importance |

Course Outcomes:

on completion of the course, the students will be able to:

| | |
|-----|---|
| CO1 | Understand soil formation and determine the index properties of soil |
| CO2 | Determine the permeability and seepage of soils for fluid flow characteristics analysis |
| CO3 | Estimate stresses under various loading conditions and compaction characteristics. |
| CO4 | Analyze the compressibility of the soils |
| CO5 | Understand the strength of soils under various drainage conditions |

UNIT -I:

INTRODUCTION: Soil formation – Soil structure – Adsorbed water – Mass- Volume relationship – Relative density. Index Properties Of Soils: Moisture Content, Specific Gravity, In-situ density, Grain size analysis – Sieve and Hydrometer methods – Consistency limits and indices – I.S. Classification of soils.

UNIT -II:

PERMEABILITY: Soil water – Capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting – Laboratory determination of coefficient of permeability – Permeability of layered systems.

SEEPAGE THROUGH SOILS: Total, neutral and effective stresses –Quick sand condition – Seepage through soils – Flow nets : Characteristics and Uses.

UNIT -III

STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart . Compaction: Mechanism of

compaction – Factors affecting – effects of compaction on soil properties. – Field compaction Equipment – Compaction control.

UNIT -IV:

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

UNIT -V:

SHEAR STRENGTH OF SOILS : Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelopes – Critical void ratio –Liquefaction.

TEXT BOOKS:

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors Delhi.
2. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).

REFERENCES:

1. Soil Mechanics and Foundation by byB.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
2. Geotechnical Engineering by Iqbal H.Khan, PHI pubilishers.
3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi.

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Semester-5 Syllabus

| SubjectCode | Title of the Subject | L | T | P | C |
|-------------|---|---|---|---|---|
| | WATER RESOURCES ENGINEERING-II
(PEC-I) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVE:

The objectives of this course are:

| | |
|---|---|
| 1 | Introduce the types of irrigation systems and introduce the concepts of planning and design of irrigation systems |
| 2 | Understand design methods of erodible and non-erodible canals |
| 3 | Know the principles of design of hydraulic structures on permeable foundations |
| 4 | Know the concepts for analysis and design principles of storage and diversion works. |
| 5 | Learn design principles of canal structures |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand the concepts of Cross Drainage works and Canal Regulation works |
| 2 | Understand various stream flow measurements technique and basic concepts in river engineering |
| 3 | Determine the storage capacity of reservoir and yield from the reservoir |
| 4 | Analyze the stability of gravity dam and seepage pattern in earth dam |
| 5 | understand about the spillways, Gates & Energy dissipaters. |

UNIT – 1

CANAL REGULATION WORKS: Canal falls: Necessity and location of falls; Types of falls; Classification of falls; Design of sarada type fall.

Canal regulators: head regulators and cross-regulators; design of cross-regulator and distributary head regulator.

CROSS DRAINAGE WORKS: Introduction; types of cross drainage works; selection of suitable type of cross drainage work; classification of aqueducts and siphon aqueducts.

UNIT-II

STREAM GAUGING: Necessity; Selection of gauging sites; Methods of Discharge Measurement Area-Velocity method; Slope-Area method; Tracer method, Electromagnetic induction method, Ultrasonic method; Measurement of depth –Sounding rod, Echo-Sounder; Measurement of velocity: Floats – Surface floats, Sub–Surface float or Double float, Velocity rod; Pitot tube ;Current meter-Rating of current meter, measurement of velocity; chemical method; Measurement of stage-Staff gauge, wire gauge, water stage recorder, bubble gauge recorder; stage-discharge curve.

RIVER ENGINEERING:

Classification of rivers; Meandering; Causes of meandering; Basic factors controlling process of meandering; Aggrading type of river; Degrading type of River.

UNIT-III

RESERVOIR PLANNING:

Introduction; Investigations for reservoir planning; Selection of site for a reservoir; Zones of storage in a reservoir; Storage capacity and yield; Mass inflow curve and demand curve; Calculation of reservoir capacity for a specified yield from the mass inflow curve; Determination of safe yield from a reservoir of a given capacity; Sediment flow in streams: Reservoir sedimentation; Life of reservoir; Reservoir sediment control; Flood routing; Methods of flood routing-Graphical Method (Inflow – Storage discharge curves method).

DAMS :GENERAL: Introduction; Classification according to use; Classification according to material- Gravity dams, Arch dams, Buttress dams, Steel dams, Timber dams, Earth dams and rock fill dams-Advantages and disadvantages; Physical factors governing selection of type of dam ; selection of site for a dam.

UNIT-IV

GRAVITY DAMS: Introduction; Forces acting on a gravity dam; Combination of loading for design; Modes of failure: stability requirements; principal and shear stresses; Stability analysis; Elementary profile of a gravity dam; Practical profile of a gravity dam; Limiting height of a gravity dam- High and low gravity dams; Design of gravity dams–single step method;

EARTH DAMS: Introduction; Types of earth dams; Causes of failure of earth dams; Criteria for safe design of earth dams; Section of an earth dam; Design to suit available materials; Seepage control measures;

UNIT-V

SPILLWAYS: Introduction; Types of spillways; Profile of ogee spillway; Energy dissipation below spillways for relative positions of jump height curve and tail water curve; Stilling basins; Indian standards on criteria for design of hydraulic jump type stilling basins with horizontal aprons; Spillway crest gates-Types and description only.

WATER POWER ENGINEERING: Development of hydro power in India; Classification of hydel plants: runoff river plants, storage plants and pumped storage plants; low, medium and high head schemes.

TEXT BOOKS:

1. Irrigation and Water Power Engineering by Dr. B.C.Punmia& Dr. Pande B.B. Lal; Laxmi Publications pvt. Ltd., New Delhi.
2. Irrigation Engineering and Hydraulic Structure by S. K. Garg; Khanna Publishers, Delhi.

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Irrigation, Waterpower and Water Resources Engineering by K R Arora; Standard Publication, New Delhi.
3. Water resources engineering by Satyanarayana Murthy. Challa, New Age International Publishers

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Semester-5 Syllabus

| SubjectCode | Title of the Subject | L | T | P | C |
|-------------|---|---|---|---|---|
| | SUBSURFACE INVESTIGATION
AND INSTRUMENTATION
(PEC-I) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|----|---|
| 1. | Understand the exploration and geophysical methods |
| 2. | Handle both laboratory and in-situ testing techniques. |
| 3. | Carry out collection, handling and preservation of samples. |
| 4. | Handle instruments during sub soil exploration process |
| 5. | Understand the usage of instrumentation in subsurface investigation |

UNIT -I

Exploration and geophysical methods:

Exploration program planning -Methods of exploration- Preliminary and detailed design- spacing and depth of bores, data presentation. Geophysical exploration and interpretation, seismic and electrical methods, cross bore hole, single bore hole – Up hole -Down hole methods.

UNIT –II

Exploration Techniques

Methods of boring and drilling, non-displacement and displacement methods, drilling in difficult subsoil conditions, limitations of various drilling techniques, stabilization of boreholes, bore logs.

UNIT -III

Soil Sampling

Sampling Techniques – Quality of samples – Factors influencing sample quality - Disturbed and undisturbed soil sampling advanced sampling techniques, offshore sampling, shallow penetration samplers, preservation and handling of samples.

UNIT -IV

Field Testing In Soil Exploration

Field tests, penetration tests, Field vane shear, Insitu shear and bore hole shear test, pressure meter test, dilatometer test - Plate load test–Monotonic and cyclic; field permeability tests – Block vibration test. Procedure, limitations, Correction and data interpretation.

UNIT -V

Instrumentation

Instrumentation in soil engineering, strain gauges, resistance and inductance type, load cells, earth pressure cells, settlement and heave gauges, pore pressure measurements - Slope indicators, sensing units, case studies.

TEXT BOOKS:

1. Alam Singh and Chowdhary G. R., "Soil Engineering in Theory and Practice, Volume-2, Geotechnical testing and instrumentation", CBS Publishers and Distributors, New Delhi, 2006.
2. Dunnicliff J., and Green, G. E., "Geotechnical Instrumentation for Monitoring Field Performance", John Wiley, 1993.

REFERENCES:

1. Bowles J. E., "Foundation Analysis and Design", 5th Edition, The McGraw-Hill companies, Inc., New York, 1995.
2. C. Venkataramiah, -Geotechnical Engineering, New age International Pvt . Ltd, (2002).
3. Hanna T. H., "Field Instrumentation in Geotechnical Engineering", Trans Tech., 1985.
4. Hunt R. E., -Geotechnical Engineering Investigation Manual, McGraw Hill, 1984.

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Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | Cost Effective Housing Techniques (PEC-I) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | To understand the requirements of structural safety for future construction. |
| 2 | To know about the housing scenario, housing financial systems land use and physical planning for housing and housing the urban poor |
| 3 | To know the traditional practices of rural housing |
| 4 | To know the different innovative cost effective construction techniques |
| 5 | To know the alternative building materials for low cost housing. |

COURSE OUTCOMES:

On Completion of the course, the students will be able to:

| | |
|-----|--|
| CO1 | Apply the concept of housing techniques and Understand housing programmes and projects |
| CO2 | Understand development and adoption of low cost housing technology |
| CO3 | Understand the Alternative building materials for low cost housing |
| CO4 | Understand low cost housing in rural areas |
| CO5 | Understand housing in disaster prone areas |

UNIT-I:

a) Housing Scenario

Introducing - Status of urban housing - Status of Rural Housing

b) Housing Finance:

Introducing - Existing finance system in India - Government role as facilitator - Status at Rural Housing Finance - Impediment in housing finance and related issues

a) Land use and physical planning for housing

Introduction - Planning of urban land - Urban land ceiling and regulation act - Efficiency of building bye lass - Residential Densities

b) Housing the urban poor

Introduction - Living conditions in slums - Approaches and strategies for housing urban poor

UNIT-II: Development and adoption of low cost housing technology

Introduction - Adoption of innovative cost effective construction techniques - Adoption of precast elements in partial prefabrication - Adopting of total prefabrication of mass housing in India- General remarks on pre cast roofing/flooring systems -Economical wall system - Single Brick thick load bearing wall - 19cm thick load bearing masonry walls - Half brick thick load bearing wall – Fly-ash gypsum thick for masonry - Stone Block masonry - Adoption of precast R.C. plank and joint system for roof/floor in the building

UNIT-III: Alternative building materials for low cost housing

Introduction - Substitute for scarce materials – Ferro-cement - Gypsum boards - Timber substitutions - Industrial wastes - Agricultural wastes - Fire resistant; for protection of alternative building maintenance

Low cost Infrastructure services:

Introduce - Present status - Technological options - Low cost sanitation - Domestic wall - Water supply, energy

UNIT-IV: Rural Housing:

Introduction traditional practice of rural housing continuous - Mud Housing technology Mud roofs - Characteristics of mud - Fire treatment for thatch roof - Soil stabilization - Rural Housing programs

UNIT-V: Housing in Disaster prone areas:

Introduction – Earthquake - Damages to houses - Traditional prone areas - Type of Damages and Repairs of non-engineered buildings - Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions. Requirement's of structural safety of thin precast roofing units against Earthquake forces Status of R& D in earthquake strengthening measures - Floods, cyclone, future safety

TEXT BOOKS

1. Building materials for low –income houses – International council for building research studies and documentation.
2. Hand book of low cost housing by A.K.Lal – Newage international publishers.
3. Properties of concrete – Neville A.m. Pitman Publishing Limited, London.
4. Light weight concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.
5. Low cost Housing – G.C. Mathur.
6. Modern trends in housing in developing countries – A.G. Madhava Rao, D.S. Ramachandra Murthy &G.Annamalai.

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COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | EXPERIMENTAL STRESS ANALYSIS (OEC-I) | 2 | 1 | 0 | 3 |

Course Objectives:

The objectives of this course are:

| | |
|---|---|
| 1 | To understand different methods of experimental stress analysis |
| 2 | To understand the use of strain gauges for measurement of strain |
| 3 | To be exposed to different Nondestructive methods of concrete |
| 4 | To understand the theory of photo elasticity and its applications in analysis of structures |
| 5 | To understand different methods of photo elasticity |

COURSE OUTCOMES:

At the end of the course student is able to :

| | |
|---|--|
| 1 | Understand different methods of experimental stress analysis |
| 2 | Understand the use of strain gauges for measurement of strain |
| 3 | Expose to different Non destructive methods of concrete |
| 4 | Understand the theory of photo elasticity and its applications in analysis of structures |
| 5 | Understand different methods of photo elasticity |

UNIT:I

PRINCIPLES OF EXPERIMENTAL APPROACH :-

Merits of Experimental Analysis Introduction, uses of experimental stress analysis

Advantages of experimental stress analysis, Different methods –Simplification of problems.

UNIT:II

STRAIN MEASUREMENT USING STRAIN GAUGES :-

Definition of strain and its relation of experimental Determinations Properties of Strain-

Gauge Systems-Types of Strain Gauges –Mechanical, Acoustic and Optical Strain Gauges.

Introduction to Electrical strain gauges - Inductance strain gauges – LVDT – Resistance strain

gauges – Various types –Gauge factor – Materials of adhesion base.

UNIT:III

STRAIN ROSSETTES AND NON – DESTRUCTIVE TESTING OF CONCRETE:-

Introduction – The three elements Rectangular Rosette – The Delta Rosette Corrections for Transverse Strain Gauge.

Ultrasonic Pulse Velocity method –Application to Concrete. Hammer Test – Application to Concrete.

UNIT:IV

THEORY OF PHOTOELASTICITY :-

Introduction –Temporary Double refraction – The stress Optic Law –Effects of stressed model in a polar scope for various arrangements – Fringe Sharpening. Brewster's Stress Optic law.

UNIT:V

TWO DIMENSIONAL PHOTOELASTICITY :-

Introduction – Isochromic Fringe patterns- Isoclinic Fringe patterns passage of light through plane Polariscope and Circular polariscope Isoclinic Fringe patterns – Compensation techniques – Calibration methods – Separation methods – Scaling Model to prototype Stresses – Materials for photo – Elasticity Properties of Photoelastic Materials.

Text Books :-

- 1.Experimental stress analysis by J.W.Dally and W.F.Riley, [College House Enterprises](#)
2. Experimental stress analysis by Dr.SadhuSingh.khanna Publishers

Reference Books :-

- 3.Experimental Stress analysis by U.C.Jindal, Pearson Publications.
4. Experimental Stress Analysis by L.S.Srinath, MC.Graw Hill Company Publishers.

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Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | ENVILRONMENTAL IMPACT ASSESSMENT (OEC-I) | 2 | 1 | 0 | 3 |

Course Objectives:

The objectives of this course are:

| | |
|---|--|
| 1 | To impart knowledge on different concepts of Environmental Impact Assessment. |
| 2 | To teach procedures of risk assessment. |
| 3 | To teach the EIA methodologies and the criterion for selection of EIA methods. |
| 4 | To teach the procedures for environmental clearances and audit. |
| 5 | To know the impact quantification of various projects on the environment. |

Course Outcomes

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

| | |
|---|---|
| 1 | Prepare EMP, EIS, and EIA report. |
| 2 | Identify the risks and impacts of a project. |
| 3 | Choose an appropriate EIA methodology. |
| 4 | Evaluation the EIA report. |
| 5 | Estimate the cost benefit ratio of a project. |

UNIT –I:

Concepts and methodologies of EIA

Initial environmental Examination, Elements of EIA, - Factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters- 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 and cost/benefit Analysis.

UNIT – II

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. Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface

water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT –III

Assessment of Impact on Vegetation, Wildlife and Risk Assessment

Introduction - Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation - Risk assessment and treatment of uncertainty-key stages in performing an Environmental Risk Assessment-Advantages of Environmental Risk Assessment

UNIT – IV

Environmental audit:

Introduction - Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT – V

Environmental Acts and Notifications:

The Environmental protection Act, The water preservation Act, The Air (Prevention & Control of pollution Act), Wild life Act - Provisions in the EIA notification, procedure for environmental clearance, procedure for conducting environmental impact assessment report- Evaluation of EIA report. Environmental legislation objectives, evaluation of Audit data and preparation of Audit report. Post Audit activities, Concept of ISO and ISO 14000.

TEXT BOOKS:

1. Canter Larry W., -Environmental Impact Assessment, McGraw-Hill education Edi (1996)
2. Y. Anjaneyulu, -Environmental Impact Assessment Methodologies, B. S. Publication, Hyderabad.

REFERENCES:

1. Peavy, H. S, Rowe, D. R, Tchobanoglous, -Environmental Engineering, G.Mc-Graw Hill International Editions, New York 1985
- 2.J. Glynn and Gary W. Hein Ke, -Environmental Science and Engineering, Prentice Hall Publishers
3. Suresh K. Dhaneja, -Environmental Science and Engineering, S.K., Katania& Sons Publication, New Delhi.
4. H. S. Bhatia, — Environmental Pollution and Control, Galgotia Publication (P) Ltd, Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---------------------------|---|---|---|---|
| | Project Management | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | To impart knowledge on principles of planning and scheduling projects, with emphasis on construction. |
| 2 | To understand the uses and suitability of various construction equipment, |
| 3 | To study the legal and ethical issues related to construction projects |
| 4 | To become familiar with TQM and similar concepts related to quality |
| 5 | To impart knowledge in the principles of safe construction practices |

COURSE OUTCOMES:

At the end of the course student is able to :

| | |
|---|---|
| 1 | Plan and schedule a construction project. |
| 2 | Select an appropriate construction equipment for a specific job |
| 3 | Familiarise the legal procedures in construction contracts |
| 4 | Formulate suitable quality management plan for construction |
| 5 | Familiarise the safety practices and procedures. |

Unit – I

Unique features of construction projects ; Identification of components –Principles of preparing DPR- Construction planning and scheduling - I – Bar charts, Network Techniques, Use of CPM and PERT for planning – Drawing network diagrams – Time estimates – Slack – Critical path-Examples

Unit – II

Crashing and time –Cost trade off, Resource smoothing and resources leveling - Construction, equipment, material and labor schedules. Preparation of job layout. Codification of the planning system : Codification approach- Work package and activities identification code – Resource codes – Cost and Finance accounting codes – Technical document codes.

Unit – III

Construction disputes and settlement: Types of disputes – Modes of settlement of disputes – Arbitration- Arbitrator - Advantages and disadvantages of arbitration – Arbitration Award.

Construction cost and budget: Construction cost – Classification of construction cost – Unit rate costing of resources- Budget – Types of budget – Project Master budget.

Unit – IV

Concept of materials management – Inventory – Inventory control – Economic order quantity- ABC analysis. Safety in construction – Safety measures in different stages of construction – Implementation of safety programme

Unit – V

onstruction procedures: different methods of construction – Types of contract – Tenders – Prequalification procedure - earnest money deposit – Contract document – General and important conditions of contract - Measurement and measurement book - Inspection and quality control - Need, principles and stages. Basics of Total Quality Management.

Text Books:

1. Kumar Neeraj Jha, Construction Project Management, Pearson, Dorling Kindersley (India) pvt. Lt
2. B.C.Punmia& K K Khandelwal, Project Planning with CPM and PERT, Laxmi Publication, New Delhi, 2016
3. L.S. Srinath – PERT and CPM –Principles and Applications, Affiliated East-West Press, 2001
4. Peurifoy and Schexnayder – Construction Planning, Equipment, and Methods, Tata McGraw Hill, 2010
5. Gahlot and Dhir, Construction Planning and Management, New Age International, 1992
6. K KChitkara, Construction Project Management, McGraw Hill Education Pvt Ltd., 2000
7. National Building Code, BIS
8. F. Harris, Modern Construction and Ground Engineering Equipment and Methods, Prentice Hall, 1994
9. Khanna, O.P., Industrial Engineering and Management., Dhanapat Rai Publications, 1980
10. Shrivastava, Construction Planning and Management, Galgotia Publications, 2000

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DEPARTMENT OF CIVIL ENGINEERING
SEMESTER-5
(Open Elective - 1)

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | Introduction to Java Programming | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES

| | |
|---|--|
| 1 | Study the computer basics , software engineering and network basics , HTML |
| 2 | Learn Java features to create applications & perform event handling . |
| 3 | Learn the Database and interconnection with java. |

COURSE OUTCOMES

| | |
|---|--|
| 1 | Ability to know basics of computer and software engineering |
| 2 | Ability to write Efficient programs of HTML |
| 3 | Create Tables with the databases and retrieving by using queries. |
| 4 | Able to design java application and dynamic behavior of classes. |
| 5 | Develop applications using different types of inheritance, polymorphism, overloading and overriding and Database and interconnection with java |

UNIT-1

Introduction to Computer Basics: Computer, Hardware, CPU, Monitor, Keyboard/mouse, Memory, - RAM, Storage, Software, OS, Application, Saving a file, Files and Folders.

Basics of Network: Home and Office Networks, Networking Types and Structures, Wired vs Wireless Networks, Networking Topologies, Networking Topology- Physical vs Logical, Peer to Peer, Client Server, Network Size.

Networking Levels and Layers and Protocols: Network Addressing, Classes of IPv4, Public and Private IP Addresses, What is a Protocol? What is a Protocol Suite?

Protocol Stacks, Networking and Internet Service: IP protocol, DHCP (Dynamic Host configuration Protocol), DNS (domain Name Service), General Networking Physical Component.

Software Engineering Fundamentals : Software Requirement, Problem Recognition, Evaluation and Synthesis, Modeling, Specification, Review, Objectives of Software Design, Software Design Concepts, Different levels of Software Design, Software Design Process, Architectural Design, Structured Programming, Functional Programming, Programming style, Software Documentation, Software Implementation Challenges , Software Validation, Software Verification, Manual Vs Automated Testing,

Testing Approaches, Testing Levels, Testing Documentation, Testing vs. Quality Control, Quality Assurance and Audit

Software Engineering Fundamentals & OOP: Overview of Software Maintenance Need for Maintenance, Categories of Software Maintenance.

Overview of Configuration management and version control : What is Software Configuration Management?, Why do we need Configuration management?, Tasks in SCM process, Configuration Identification, Baseline, Change Control, Configuration Status Accounting, Configuration Audits and Reviews, Participant of SCM process, Software Configuration Management Plan, Software Configuration Management Tools.

Agile Basics:

What is Agile?, What are Agile Methodologies?, What is the Agile Manifesto?, What is Agile project management?, Agile Scrum methodology.

OOP :

Object Oriented Concepts Problems in Functional Programming, What Is ObjectOriented Programming? , Objects and Classes Declaration of Class, Declaring Objects, State of an Object, Behaviour of an Object Principles in ObjectOriented technology Abstraction, Encapsulation

OOP & HTML, CSS and JavaScript:

Principles in Object-Oriented technology, Inheritance, Polymorphism

HTML, CSS and JavaScript

Introduction to Web Technology

World Wide Web, IoT, Web Programming, Web Framework, HTML, CSS and JavaScript

Introduction to HTML5: HTML5 Elements, Semantic Elements HTML Overview, HTML Versions, Semantic Web, Semantic Elements in HTML5, <header>, <nav>, <section>, <article>, <aside>, <footer>

Table, List, Working with Links, Image Handling

Define an HTML Table, <table>, <tr>, <td>, <th>, <caption>, Unordered List, Ordered List, Description List, , , , <dl>, <dt>, <dd>, Hyperlinks, The target Attribute, Absolute URLs vs. Relative URLs, Use an Image as a Link, Link to an Email Address, <a>, href Attribute, , The src Attribute, The alt Attribute, Image Size - Width and Height, Image as a Link

Form-Input Elements, HTML5 Form elements

The <form> Element, The <input> Element, Text Fields, The <label> Element, Radio Buttons, Checkboxes, The Submit Button

UNIT-II

HTML, CSS and JavaScript:

HTML5 Attributes, Video & Audio, iframes

Standard Attributes, align, background, bgcolor, class, height, hidden, id, style, tabindex, valign, width, Embedding Video, Embedding Audio, Handling Media Events, HTML <iframe> Tag

Introduction to CSS3, CSS Syntax, CSS Styling

What is CSS, Why use CSS, Inline Style, CSS Style Tags, Linking to CSS, Style Override Precedence

Text and Fonts properties, CSS Selectors, Different color schemes

Text Color and Background Color, CSS Text Alignment, Text Direction, Vertical Alignment, Generic Font Families, The CSS font-family Property, Font Style, Font Size

CSS Borders, CSS Margins, CSS Backgrounds

CSS Border Style, The border-style property, Border Width, Border Color, Border Sides, CSS Rounded Borders, margin-top, margin-right, margin-bottom, margin-left, CSS background-color, Opacity / Transparency, CSS background-image, CSS background-repeat

JavaScript basics

Introduction to Javascript, Execution of Javascript, Scripts in head and body of HTML, Internal and External Javascript, Javascript Variables, Comments

Functions in Javascript

JavaScript Function Syntax, Built in methods in Javascript, Function Invocation, Function Return, Why Functions?, The () Operator Invokes the Function, Functions Used as Variable Values, Local Variables

Javascript validation

Client-side form validation, Different types of client-side validation, Using built-in form validation, Validating forms using JavaScript, Validating forms without a built-in API

Events, Javascript event handling

Introduction to JavaScript events, Event flow, Event bubbling, Event capturing, Event object, addEventListener(), preventDefault(), stopPropagation()

JavaScript Strings

String Methods and Properties, String Length, Extracting String Parts, The substring() Method, Replacing String Content, Converting Upper and Lower Case, The concat() Method

JavaScript Dates

JavaScript Date Output, Creating Date Objects, new Date(), new Date(year, month, ...), new Date(dateString), Date Methods, Displaying Dates

Array in Javascript

What is an Array, Creating an Array, Accessing Array Elements, Array Properties and Methods, Looping Array Elements

Document Object Model (Window, Frame, Navigator Objects)

What is Document Object Model (DOM), Node Types, The nodeName and nodeValue properties, Node and Element, Node Relationships

Working with Document Object (Its Properties and methods, Cookie handling)

Selecting Elements, Traversing Elements, Manipulating Elements

RDBMS Concepts and SQL Using Oracle:

Introduction to RDBMS Concepts

What is a Relational Database, The relational model, Benefits of relational database management system, ACID properties and RDBMS ,Introduction to SQL History of SQL, SQL Standards, How SQL Works Creating and Managing Tables , Guidelines for Managing Tables, Creating Tables, Altering Tables, Dropping Tables, Data Manipulation: INSERT, UPDATE, DELETE

UNIT-III

RDBMS Concepts and SQL Using Oracle:

Basic SQL SELECT Statements

SELECT, FROM Clause, Comparison Operators, WHERE Clause, ORDER BY, AND, OR, DISTINCT, IN, IS NULL, IS NOT NULL, LIKE, REGEXP_LIKE, NOT, ALIASES

Scalar & Aggregate Functions

String Functions, Numeric Functions, Date Functions, Conversion Functions, NULL-related Functions, AVG, COUNT, MAX, MIN, LISTAGG, SUM

Joins & Subqueries

Oracle INNER JOIN, Oracle LEFT JOIN, Oracle RIGHT JOIN,

Introduction to the Oracle Subquery: Advantages of Oracle Subqueries, Oracle Subquery in the SELECT clause, Oracle Subquery in the FROM clause, Oracle Subquery with comparison operators, Oracle Subquery with IN and NOT IN operators, Oracle correlated Subquery, Oracle correlated Subquery in the WHERE clause, Oracle correlated Subquery in the SELECT clause, Oracle correlated Subquery with the EXISTS operator

Views & Index

What is a VIEW in Oracle, Create VIEW, Update VIEW, DROP VIEW, What is an Index in Oracle, Create an Index, Create a Function-Based Index, Rename an Index, Drop an Index

RDBMS Concepts and SQL & Introduction to Java:

Sequence, Synonym

About Sequences, Creating Sequences, Altering Sequences, Using Sequences, Dropping Sequences

About Synonyms, Creating Synonyms, Using Synonyms in DML Statements, Dropping Synonyms

Data Control Language Statements , GRANT, REVOKE

Introduction to Java

Features of Java, Java Runtime Environment, Developing software in Java

UNIT-IV

Introduction to Java Programming

Language Fundamentals: Keywords, Primitive Data Types, Operators and Assignments, Flow Control:

Java's Control Statements.

Classes and Objects: Access Specifiers, Constructors - Default and Parameterized, Method & Constructor Overloading, this reference, using static keyword, Wrapper Classes, Using Scanner Class

Strings, String Handling functions. Array: One dimensional array, Array of Objects, Using varargs, Using Arrays class.

UNIT-V Collections:

Collection basics, Set, HashSet, Map, HashMap, List, Array List.

JDBC: JDBC Basics, JDBC architecture, JDBC Drivers. Process SQL with JDBC, JDBC Introduction JDBC Driver, Create Connection, Query, Update.

Text books:

1. <https://www.geeksforgeeks.org>
2. <https://www.w3schools.com>
3. <https://www.oracletutorial.com>
4. <https://www.tutorialspoint.com>
5. <https://www.javatpoint.com>

References:

1. <https://www.pcmag.com/encyclopedia>
2. <https://www.computerhope.com>
3. <https://courses.lumenlearning.com>
4. <https://docs.microsoft.com/en-us/windows-server/networking/technologies>

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DEPARTMENT OF CIVIL ENGINEERING
SEMESTER-5
(Open Elective - 1)

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-----------------------------|---|---|---|---|
| | Java Programming Lab | | - | - | - |

| COURSE OBJECTIVES | |
|-------------------|--|
| 1 | Study the computer basics , software engineering and network basics , HTML |
| 2 | Learn Java features to create applications & perform event handling . |
| 3 | Learn the Database and interconnection with java. |

| COURSE OUTCOMES | |
|-----------------|--|
| 1 | Ability to know basics of computer and software engineering |
| 2 | Ability to write Efficient programs of HTML |
| 3 | Create Tables with the databases and retrieving by using queries. |
| 4 | Able to design java application and dynamic behavior of classes. |
| 5 | Develop applications using different types of inheritance, polymorphism, overloading and overriding and Database and interconnection with java |

Week-1:

1. Problem Title: BankAccount Class:

- Create a Java class called BankAccount which represents a bank account, having as attributes: accountNumber (numeric type), name (name of the account owner as string type), balance.
- Create a constructor with parameters: accountNumber, name, balance.
- Create a deposit() method which manages the deposit actions.
- Create a withdrawal() method which manages withdrawals actions.
- Create a bankFees() method to apply the bank fees with a percentage of 5% of the balance account.
- Create a display() method to display account details.
- Give the complete code for the BankAccount class.

Week-2:

2. Problem Title: Person Class

- Create a Java class Person with attributes: name and age of type string.
- Create a display() method that displays the name and age of an object created via the Person class.
- Create a child class Student which inherits from the Person class and which also has a section attribute.
- Create a method displayStudent() that displays the name, age and section of an object created via the Student class.

- Create a student object via an instantiation on the Student class and then test the displayStudent method.

Week-3:

3. Create a website with the following information and structure using HTML5:



The contents of the home page should be:

- Logo and title of the website
- Navigation bar: links to presentation, studies and staff
- News (aside/article/section)
- Announcements (aside/article/section)
- Footer: contact information and copyright
- Use these tags: <header>, <nav>, <aside>, <article>, <section>, <time>, <footer>.
- Here logo image, news, announcements used can be any suitable data

Design below form using HTML5:

Vistor Entry Form

| | |
|--|--|
| Name | <input type="text" value="Enter your name"/> |
| Gender | <input type="radio"/> Male <input type="radio"/> Female |
| Mobile Number | <input type="text" value="Enter your mobile number"/> |
| Address | <input type="text" value="Enter your address"/> |
| City | <input type="text" value="Mumbai"/> ▾ |
| How you come to know about us | <input type="checkbox"/> Tv news <input type="checkbox"/> Internet |
| <input type="button" value="Reset"/> <input type="button" value="Submit"/> | |

Note:

- City is drop down list with multiple city names
- Name, mobile number, address are mandatory fields. If any of these field is empty, after clicking submit button, it should show like this.

Vistor Entry Form

Name

Gender

Mobile Number

Address

City

How you come to know about us ☐ Tv news ☐ Internet

Validation Error: Please fill out this field.

Week-4:

4. Problem Description:

1. To Create this a HTML Application create a folder called TestCSS.
2. create a file called TableWithCSS.html
3. In the body tag, create a table with header, table rows and table data.
4. Use Internal CSS and provide styles as in sample output
5. Use any png image as background to table header with border radius of 6px.Refer to output for color, height, width and font-size.
6. For the table, provide collapse to border-collapse attribute
7. For table data provide border of 1 px dotted and padding of 15px, width 100px, refer to other properties and background color as in output
8. Run the Application in Live Server as <http://127.0.0.1:5500/TableWithCSS.html>

Or open the Application in browser

Week-5:

5. Problem Description:

1. To Create this HTML Application, create a folder called Telephone.
 2. create a file called TelephoneComplaint.html
 3. In the body tag create a form and table as shown in sample output with the labels and input types as shown.
 4. Include the following options under Nature Of Complaint
 5. 1.Disconnection Problem 2.Phone Dead
 - 3.Other
 6. Create a TelephoneComplaint.css file and define the CSS properties here as per sample output
- Link CSS file to HTML file.

Sample output:

| Telephone Complaint Registration Form | |
|---------------------------------------|--|
| Enter Subscriber ID | <input type="text" value="Enter Your Subscriber ID"/> |
| Subscriber Name | <input type="text" value="Enter Subscriber Name"/> |
| Address | <input type="text" value="Enter Your Address"/> |
| Registered Mobile Number | <input type="text" value="Enter Mobile No"/> |
| Registered Email ID | <input type="text" value="Enter Email Id"/> |
| Subscriber Category | <input type="radio"/> Residential Home User
<input type="radio"/> Business/SME User |
| Nature Of Complaint | <input type="text" value="Disconnection Problem"/> |
| Detailed Complaint Description | <input type="text"/> |
| Complaint Raised Date | <input type="text" value="dd-mm-yyyy"/> |
| <input type="button" value="Submit"/> | |

Week-6:

6. Problem Description:

1. To Create this HTML Application, create a folder called pyramid.
2. Create a file called pyramid.html
3. Use internal JS and define a function called buildPyramid with the number of rows as parameter
4. Write the logic to construct a pyramid in the function.
5. Invoke the function with any value as row argument.

Open the application in browser or run in Live Server with URL as <http://127.0.0.1:5500/pyramid.html>

Sample output:

```

      *
    * *
  * * *
* * * *
* * * * *

      *
    * *
  * * *
* * * *
* * * * *
  
```

Week-7:

7. Problem Description:

For this Application, use the existing application TelephoneComplaint.html created in folder Telephone under section 4.3

Modify the HTML page to include the below validations in JavaScript

1. Subscriber Name is required and should have max length of 10.
2. validate Email to have @ and. symbol.
3. Registered Mobile number should be 10 digits

Detailed Complaint Description box should be disabled initially, and when user chooses Other option in Nature of Complaint, Description box should get enabled and get disabled when a subscriber changes the Nature Of Complaint to something else. (Disconnection Problem/Phone Dead).

Hint: Use onchange event and write JS Code in function enableDisableTextBox(this) to enable/disable description box. This refers to the option currently selected

Complaint raised date should be current date and shouldn't be changed, it should be readonly and the date should be populated as soon as the form loads in browser.

Hint: write code in JS function getDate() to load current date. Invoke this function using window.onload.

Open the application in browser or in LiveServer with URL as

<http://127.0.0.1:5500/TelephoneComplaint.html>

Sample Output when form loads on browser (Assume sysdate/currentDate is 20-07-2021)

| Telephone Complaint Registration Form | |
|---------------------------------------|---|
| Enter Subscriber ID | <input type="text" value="Enter Your Subscriber ID"/> |
| Subscriber Name | <input type="text" value="Enter Subscriber Name"/> |
| Address | <input type="text" value="Enter Your Address"/> |
| Registered Mobile Number | <input type="text" value="Enter Mobile No."/> |
| Registered Email ID | <input type="text" value="Enter Email Id."/> |
| Subscriber Category | <input checked="" type="radio"/> Residential Home User
<input type="radio"/> Business/SME User |
| Nature Of Complaint | <input type="text" value="Speed related problem"/> |
| Detailed Complaint Description | <input type="text" value=""/> |
| Complaint Raised Date | <input type="text" value="20-07-2021"/> |
| <input type="button" value="Submit"/> | |

Sample Output when NatureOf Complaint is chosen as Other

| Telephone Complaint Registration Form | |
|---------------------------------------|--|
| Enter Subscriber ID | <input type="text" value="Enter Your Subscriber ID"/> |
| Subscriber Name | <input type="text" value="Enter Subscriber Name"/> |
| Address | <input type="text" value="Enter Your Address"/> |
| Registered Mobile Number | <input type="text" value="Enter Mobile No."/> |
| Registered Email ID | <input type="text" value="Enter Email Id."/> |
| Subscriber Category | <input type="radio"/> Residential Home User
<input type="radio"/> Business/SME User |
| Nature Of Complaint | <input type="text" value="Other"/> |
| Detailed Complaint Description | <input type="text" value=""/> |
| Complaint Raised Date | <input type="text" value="20-07-2021"/> |
| <input type="button" value="Submit"/> | |

8. Problem Description:

Zip codes consist of 5 consecutive digits. Given a string, write a JavaScript function isValid(zipCode) to determine whether the input is a valid zip code.

A valid zip code is as follows:

- Must only contain numbers (no non-digits allowed).
- Must not contain any spaces. Must not be greater than 5 digits in length

Examples:

isValid("59001") → true isValid("853a7") → false isValid("732 32") → false isValid("393939") → false

A group of friends have decided to create a secret code which will be used to login their application. This code will be the first letter of their names, sorted in alphabetical order and count of group members.

Create a function that takes in an array of names and returns the secret code.

Examples:

findCode(["Adam", "Sarah", "Malcolm"]) → "AMS3"

findCode(["Harry", "Newt", "Luna", "Cho"]) → "CHLN4"

findCode(["Phoebe", "Chandler", "Rachel", "Ross", "Monica", "Joey"]) → "CJMPRR6"

Note

The secret code name should entirely uppercased

Week-8:

9. Problem Description:

1. To Create this application, create a folder called DomManipulation.
2. Create a HTML file called dom.html with hyperlink for the paragraph text
3. –[On mouse hover here bold words of the following paragraph will be highlighted]||
4. Include 2 events onMouseOver and onMouseOut for the above hyperlink. For onMouseOver define a function highlight() and for onMouseOut define a function return_normal.
5. Include the other paragraph having bold(strong) and non bold text as in output.
6. Create an external JS called dom.js and link to html file.

7. Define following functions in dom.js such that when window loads, it invokes function getBold_items().

getBold_items() gets all the bold tags with tagname strong and stores it.

9. highlight() iterates all stored bold tags and changes color to red.
10. return_normal() makes all highlighted words dark once the mouse is moved out from hyperlink
11. Open the html application in browser or run in LiveServer with URL <http://127.0.0.1:5500/dom.html>

Sample Output:

On loading the page in browser

[\[On mouse hover here bold words of the following paragraph will be highlighted\]](#)

We have just started **this** section for the users (beginner to intermediate) who **want** to work with **various** JavaScript **problems** and write scripts online to **test** their JavaScript **skill**.

Sample output-1 when mouse is moved over hyperlink

[\[On mouse hover here bold words of the following paragraph will be highlighted\]](#)

We have just started **this** section for the users (**beginner** to intermediate) who **want** to work with **various** JavaScript **problems** and write scripts online to **test** their JavaScript **skill**.

Sample Output-2 when mouse is moved away from hyperlink

10. Problem Description:

Given a list of items

```

<ul id="menu">
<li>Homepage</li>
<li>Services</li>
<li>About</li>
<li>Contact</li>
</ul>

```

Manipulate DOM using JS such that the DOM is changed to

- Home
- Services
- About

11. Problem Description:

Using DOM Manipulation create a dynamic shopping List as below

My shopping list

Enter a new item:

As items are entered, it gets added as below with the option to delete

My shopping list

Enter a new item:

- Milk
- Veggies
- Chocolates

When Chocolates is deleted, the List should be

My shopping list

Enter a new item:

- Milk
- Veggies

Week-9:

12. Problem Title: Insert Records – Tickets

Insert the below records into tickets table.

| Ticket_id | Schedule_id | User_id | No_seats |
|-----------|-------------|---------|----------|
| T1 | S5 | 1 | 2 |

| | | | |
|----|----|---|---|
| T2 | S2 | 5 | 1 |
|----|----|---|---|

13. Problem Title: Department name based on block number

Write a query to display the names of the departments in block number 3 in ascending order.

14. Problem Title: Students Name based on Start and Ending Character

Write a query to display the names of the students that start with letter 'A' and end with the letter 'a', ordered in ascending order.

15. Problem Title: Number of departments

Write a query to display the block number and number of departments in each block and give an alias as NO_OF_DEPT. Sort the result based on NO_OF_DEPT in descending.

16. Problem Title: Subject with Staff Details

Write a query to display the subjectname, code and staff name who handles that subject, ordered by code in ascending order.

17. Problem Title: Maximum mark in Subject with Staff name

Write a query to display list of staff name, subject name handled and maximum mark scored in that subject. Give an alias to the maximum mark as max_mark. Sort the result based on maximum mark in descending

18. Problem Title: Salesmen from New York

Write a query to create a view for those salesmen belongs to the city New York. Refer the following schema

| <u>Salesman_id</u> | <u>name</u> | <u>city</u> | <u>commission</u> |
|--------------------|-------------|-------------|-------------------|
| 5001 | James Hoog | New York | 0.15 |
| 5002 | Nail Knite | Paris | 0.13 |
| 5005 | Pit Alex | London | 0.11 |
| 5006 | Mc Lybn | Paris | 0.14 |
| 5007 | Paul Adam | Rome | 0.13 |
| 5003 | Lauson Hen | San Jose | 0.12 |

Problem Title: Create Index on Customer table

Create an index named customer_name for the cust_name column of the customer table Refer the following schema

Week-10:

19. Problem Title: Create Sequence

Write a PL/SQL query to create an ascending sequence called id_seq, starting from 10, incrementing by 10, minimum value 10, maximum value 100.

20. Problem Title: Use Sequence in a Table Column

Create a new table called tasks with the below DDL query CREATE TABLE tasks(
id NUMBER PRIMARY KEY,

title VARCHAR2(255) NOT NULL

);

Create a sequence called task_id_seq for the id column of the tasks table and use it while inserting records to the tasks table:

21. Problem Title: Print Name

Write a Java program to print 'Hello' on screen and then print your name on a separate line.

Sample Output 1:

Hello Alex.

22. Problem Title: Divide Numbers

Write a Java program to divide two numbers and print on the screen.

Sample Input 1:

50/3

Sample Output 1:

16

23. Write a Java program to Print “Hello World” 5 times using for loop.

Sample Output 1:

Hello World Hello World Hello World Hello World Hello World

24. Problem Title: Swap Numbers

Write a Java program to swap two numbers.

Sample Input 1:

Input the First Number: 5 Input the Second Number: 6

Sample Output 1:

After Swapping: First Number : 6 Second Number : 5

25. Problem Title: Fibonacci Sequence

Construct Fibonacci sequence controlled by a do-while loop

Sample Output 1:

0,1,1,2,3,5,8,13,21,34

26. Problem Title: Area of Circle

Write a Java program to print the area of a circle. Radius = 7.5

Sample Output 1:

Area is = 176.71458676442586

27. Problem Title: Temperature convertor

Write a Java program to convert temperature from Fahrenheit (ex 212) to Celsius degree

Sample Input 1:

Given temperature in Fahrenheit: 212

Sample Output 1:

212.0 degree Fahrenheit is equal to 100.0 in Celsius

Week-11:

Problem Title: Product class

28. Create class ProductTwoNum with two integer values and computes their product by calling the instance method `int computeProd(int num1, int num2)`.

Sample Input 1

Num1 : 20

Num2 : 3

Sample Output 1

The product of 20 and 3 is 60.

Problem Title: Area calculation and print details

29. Write a program to print the area of two rectangles having sides (4,5) and (5,8) respectively by creating a class named `_Rectangle` with a method named `_rectangleArea` which returns the area and length and breadth passed as parameters to its constructor.

Sample Output 1

Print the area of the Rectangle

Problem Description:

30. Smith has library of magazines. He wants to maintain information of magazines. Write a java program for this. Create a class `Magazine` with the following attributes: `id`, `title`, `author`, `price` Methods:

Sample Input 1

If below sample values are set for magazine object

| Id | Title | Author | Price |
|-----------|-----------------|---------------|--------------|
| 23 | Journey of Life | Michael Jo | 600 |

Enter discount percentage: 5

Sample Output 1 Magazine Details: Id: 23

Title: Journey of Life Author: Michael Jo Price: 570

31. Problem Description:

Alina has to keep track of customers data who are buying products from her shop. For this create a class `Customer` with the following attributes: `customerId`, `customerName`, `contactNo`, `paymentDone`

- Parameterized constructor
- `displaydetails()` to display the details of the magazines
- `discountedPrice()` : pass the discount percent, calculate the discount on price and return the amount to be paid after discount

Sample Input 1

If below sample values are set for customer object

| customerId | customerName | contactNo | paymentDone |
|------------|--------------|------------|-------------|
| 56 | Anjali | 9123456789 | 700 |
| 89 | Sujoy | 8123456790 | 360 |
| 22 | Manju | 7654389129 | 1200 |

Sample Output 1

Total payment done is 2260 Rs.

Highest payment done customer details: Customer Id: 22

Customer Name: Manju Contact number: 7654389129

Payment done: 1200

Week – 12:

32. Problem Title: Palindrome check

Write a program to Identify string given by user is palindrome or not.

Sample Input 1

Enter String: Malayalam

Sample Output 1

Given String is palindrome

Sample Input 2 Enter String: Test Sample Output 2

Given String is not palindrome

Problem Description:

33. Write a java program with method checkEnding() that takes two strings and returns true if the first string ends with the second string, otherwise return false.

Sample Input 1

checkEnding(–abc,||bc);

Sample Output 1

true

Sample Input 2 checkEnding(–samurai,||pi); Sample Output 2

False

34. Problem Description:

Write a Java program to calculate the average value of array elements.

Sample Output 1

Average value of the array elements is: 7.0

Problem Description:

Write a Java program to find the maximum and minimum value of an array.

Sample Output 1

Original Array: [25, 14, 56, 15, 36, 56, 77, 18, 29, 49]

Maximum value for the above array = 77 Minimum value for the above array = 14

Problem Description:

35. Write a Java program to create a new array list, add some elements (string) and print out the collection.

Sample Output 1:

[Red, Green, Orange, White, Black]

Problem Description:

36. Problem Description:

Write a Java program to iterate through all elements in a hash Map.

Sample Output 1:

Red White Pink Yellow Black Green

37. Problem Description:

Declare an ArrayList called numList to hold values of Integer type. Write code such that the duplicate values are removed.

Sample Input 1

[1,2,3,2,1,4,5,6,6,7,8,8]

Sample Output 1

[1,2,3,4,5,6,7,8]

38. Problem Description:

Write a program to store only unique elements of Employee type in the collection, the uniqueness of employee must be identified by the employeeId, the employee must have other properties like name, salary & designation. Print all the employees stored in the collection.

Hint: Use Set<Employee> set = new HashSet<Employee>(); to store the employee object

Sample Output 1

Employee Id = 100, Name = Alex, Salary = 25000, Designation = Manager Employee Id = 101, Name = Bruce, Salary = 15000, Designation = Tester

39. Problem Description:

Use the comparator and sort the employee's id in ascending and descending order and print the employees in both ascending & descending order

40. Problem Description:

Create a menu that will display 4 options

- a. Store
- b. Display by id
- c. Delete by id
- d. Exit

The menu should repeat until you enter exit, however the other options must perform operations like storing in the collection, displaying the item based on the id, deleting the item based on id. The item has to be an Employee with properties like id, name, salary and designation. Employee properties must be initialized dynamically

Define a Java Class Main and in main method write code to load driver and establish connection with database.

| studentId | studentName | Branch | Percentage |
|-----------|-------------|-------------|------------|
| 100 | Ann | Electronics | 70.5 |
| 101 | Ben | Computers | 71.3 |
| 102 | Ken | Mech | 60 |
| 103 | Ram | Computers | 90 |
| 104 | Bhim | Mech | 72 |
| 105 | Shyam | Computers | 86 |

Sample Output:

| studentId | studentName | Branch | Percentage |
|-----------|-------------|-----------|------------|
| 103 | Ram | Computers | 90 |
| 105 | Shyam | Computers | 86 |

Week-13:

41. Problem Description:

Create a menu that will display 4 options

- a. Store
- b. Display by id
- c. Delete by id
- d. Exit

The menu should repeat until you enter exit, however the other options must perform operations like storing in the collection, displaying the item based on the id, deleting the item based on id. The item has to be an Employee with properties like id, name, salary and designation. Employee properties must be initialized dynamically.

42. Write the menu driven program using JDBC which will have following options

- a. Store
- b. Display by id
- c. Delete by id
- d. Update salary by id
- e. Exit

The menu should repeat until you enter exit, however the other options must perform operation like storing in the database, displaying the item based on the id, deleting the item based on id, updating the salary of the item based on id. The item has to be an Employee with properties like id, name, salary and designation. Employee properties must be initialized dynamically and also program must ask the id dynamically to perform display and delete and for update id and salary must be dynamic.

Text books:

6. <https://www.geeksforgeeks.org>
7. <https://www.w3schools.com>
8. <https://www.oracletutorial.com>
9. <https://www.tutorialspoint.com>
10. <https://www.javatpoint.com>

References:

5. <https://www.pcmag.com/encyclopedia>
6. <https://www.computerhope.com>
7. <https://courses.lumenlearning.com>
8. <https://docs.microsoft.com/en-us/windows-server/networking/technologies>

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
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B.Tech (R-19 Civil Engineering)
Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------|---|---|---|-----|
| | CONCRETE TECHNOLOGY LAB | 0 | 0 | 3 | 1.5 |

COURSE OUTCOMES

| | |
|---|---|
| 1 | To determine the consistency and fineness of cement. |
| 2 | To understand the non-destructive testing procedure on concrete. |
| 3 | To determine the workability of cement concrete by compaction factor, slump and Vee-Bee tests |
| 4 | Ability to know the setting times of cement. |
| 5 | To determine the specific gravity of fine aggregate and coarse aggregate. |

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

LIST OF EQUIPMENT:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Vicat's apparatus
6. Specific gravity bottle.
7. Lechatlier's apparatus.
8. Slump and compaction factor setups
9. Longitudinal compressor meter and 1
10. Rebound hammer, Pulse velocity machine.
11. Relevant IS Codes

Reference books:-

1. Concrete Manual by M.L.Gambhir, DhanpatRai&co., Fourth edition.
2. Building construction and materials(Lab Manual) by Gambhir , TMH publishers.

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B.Tech (R-19 Civil Engineering)
Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-------------------------------------|---|---|---|-----|
| | GEOTECHNICAL ENGINEERING LAB | 0 | 0 | 3 | 1.5 |

OBJECTIVE:

The object of the course is to enable the students to know the various characteristics of soils

Course Outcomes:

At the end of the course, the student must be able to:

- Identify various soils based on their characteristics.
- Evaluate permeability and seepage of soils.
- Determine plasticity characteristics of various soils.
- Understand the consolidation process and thereby predicting the settlement of soils.

LABORATORY EXPERIMENTS

1. Specific gravity
2. Grain size analysis by sieving
3. Field density-Core cutter and Sand replacement methods
4. Atterberg's Limits.
5. Proctor Compaction test
6. Permeability of soil - Constant and Variable head tests
7. CBR Test
8. Direct Shear test
9. Unconfined Compression test
10. Triaxial Compression test (UU Test)
11. Differential free swell (DFS)
12. Hydrometer Analysis Test (Demonstration)
13. Consolidation test (Demonstration)
14. Vane Shear test

TEXT BOOKS:

1. K. R. Arora, –Soil Mechanics and Foundation Enggll., Standard Publishers and Distributors, Delhi.
2. C. Venkataramiah, –Geotechnical Engineeringll, New age International Pvt . Ltd, (2002).

REFERENCES:

1. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, —Soil Mechanics and Foundationll, Laxmi publications Pvt. Ltd., New Delhi.
2. Gopal Ranjan & A. S. R. Rao, –Basic and Applied Soil Mechanicsll, New age International Pvt . Ltd, New Delhi.
3. Braja M. Das –Principles of Geotechnical Engineeringll, Cengage Learning.

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Semester-5 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-----------------------------|---|---|---|---|
| | Research Methodology | 3 | 0 | 0 | 0 |

| COURSE OBJECTIVES : The objective of this course is | |
|--|---|
| 1 | To understand the basic concepts of research and research problem |
| 2 | To make the students learn about various types of data collection and sampling design |
| 3 | To enable them to know the method of statistical evaluation |
| 4 | To make the students understand various testing tools in research |
| 5 | To make the student learn how to write a research report |
| 6 | To create awareness on ethical issues in research |

| COURSE OUTCOMES: At the end of the course, students will be able to | |
|--|--|
| CO1 | Define the basic concepts and its methodologies |
| CO2 | Understand the concept of sampling, research design etc. |
| CO3 | Demonstrate the knowledge of research processes |
| CO4 | Analyze the importance of research articles in their academic discipline |
| CO5 | Select appropriate testing tools used in research |
| CO6 | Design a research paper without any ethical issues |

UNIT I Introduction to Research

Meaning of Research – Objectives of Research – Types of Research – Research Approaches – Guidelines for Selecting and Defining a Research Problem – Research Design – Concepts related to Research Design – Basic Principles of Experimental Design.

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the concept of research and its process
- Explain various types of research
- Know the steps involved in research design
- Understand the different research approaches

UNIT II Sampling Design

Steps in Sampling Design – Characteristics of a Good Sample Design – Random Sampling Design. Measurement and Scaling Techniques-Errors in Measurement – Tests of Sound Measurement – Scaling and Scale Construction Techniques – Time Series Analysis – Interpolation and Extrapolation. Data Collection Methods – Primary Data – Secondary data – Questionnaire Survey and Interviews.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the concept of sampling and sampling design
- Explain various techniques in measurement and scaling
- Learn various methods of data collection
- Design survey questionnaires for different kinds of research
- Analyze the questionnaires

UNIT III Correlation and Regression Analysis

Method of Least Squares – Regression vs Correlation – Correlation vs Determination – Types of Correlations and Their Applications

LEARNING OUTCOMES:-After completion of this unit student will

- Know the association of two variables
- Understand the importance of correlation and regression
- Compare and contrast correlation and regression
- Learn various types of correlation
- Apply the knowledge of C&R Analysis to get the results

UNIT IV Statistical Inference

Tests of Hypothesis – Parametric vs Non-parametric Tests – Hypothesis Testing Procedure – Sampling Theory – Sampling Distribution – Chi-square Test – Analysis of variance and Covariance – Multivariate Analysis

LEARNING OUTCOMES:-After completion of this unit student will

- Know the statistical inference
- Understand the hypothesis testing procedure
- Compare and contrast Parametric and Non-parametric Tests
- Understand the use of chi-square test in investigating the distribution of categorical variables
- Analyze the significance of variance and covariance

UNIT V Report Writing and Professional Ethics

Interpretation of Data – Report Writing – Layout of a Research Paper – Techniques of Interpretation- Making Scientific Presentations in Conferences and Seminars – Professional Ethics in Research.

LEARNING OUTCOMES:-After completion of this unit student will

- Learn about report writing
- Understand how to write research paper
- Explain various techniques of interpretation
- Understand the importance of professional ethics in research
- Design a scientific paper to present in the conferences/seminars

□

Text books:

1. Research Methodology: Methods and Techniques – C.R.Kothari, 2nd Edition, New Age International Publishers.
2. Research Methodology: A Step by Step Guide for Beginners- Ranjit Kumar, Sage Publications

REFERENCES:

1. Research Methodology and Statistical Tools – P.Narayana Reddy and G.V.R.K.Acharyulu, 1st Edition, ExcelBooks, New Delhi.
2. Business Research Methods–Donald R. Cooper & Pamela S Schindler, 9/e,
3. S C Gupta, Fundamentals of Statistics, 7th Edition Himalaya Publications

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Semester-6 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---------------------------------------|---|---|---|---|
| | TRANSPORTATION ENGINEERING – I | 2 | 1 | 0 | 3 |

COURSE OBJECTIVE:

The objectives of this course are:

| | |
|----|---|
| 1. | To make the student understand the importance of Highway Development in Social and Economic Development of a Nation |
| 2. | To impart the concepts of Geometric Design of various Highway Infrastructure elements like Superelevation, Sight Distances, Radius of Curve, Extra widening etc |
| 3. | To make the student aware of Basic Traffic Parameters and Surveys needed for Collecting Data about them |
| 4. | To make the student understand the need for Management of Traffic in Urban areas and the measures available |
| 5. | To familiarize the students with types of Road Intersections and their design elements |

OUTCOMES:

On completion of the course, the students will be able to:

| | |
|-----|---|
| CO1 | Understand the importance of Highway Development in Social and Economic Development of a Nation |
| CO2 | Understand the concepts of Geometric Design of various Highway Infrastructure elements like Super elevation, Sight Distances, Radius of Curve, Extra widening etc |
| CO3 | Understand of Basic Traffic Parameters and Surveys needed for Collecting Data about them |
| CO4 | Understand the need for Management of Traffic in Urban areas and the measures available |
| CO5 | Familiar with types of Road Intersections and their design elements capable of Designing Flexible and Rigid Pavements |

UNIT I

HIGHWAY DEVELOPMENT AND PLANNING:

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

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 STUDIES:

Basic Parameters of Traffic-Volume, Speed and Density – Definitions and their inter relation – Highway capacity and level of service concept – factors affecting capacity and level of service - Traffic Volume Studies- Data Collection and Presentation-Speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

TRAFFIC REGULATION AND MANAGEMENT:

Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Specifications - Design of Traffic Signals –Webster Method –Saturation flow – phasing and timing diagrams – Numerical problems.

UNIT – IV

INTERSECTION DESIGN:

Conflicts at Intersections- Channelization: Objectives –Traffic Islands and Design criteria- Types of At-Grade Intersections – Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT – V

PAVEMENT DESIGN:

Types of pavements – Difference between flexible and rigid pavements – Pavement Components – Sub grade, Sub base, base and wearing course – Functions of pavement components – Design Factors – Flexible pavement Design methods – G.I method, CBR Method, (as per IRC 37-2002) – Design of Rigid pavements – Critical load positions - Westergaard's stress equations – computing Radius of Relative stiffness and equivalent radius of resisting section – stresses in rigid pavements – Design of Expansion and contraction joints in CC pavements. Design of Dowel bars and Tie bars.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 7th edition (2000).
2. Traffic Engineering and Transportation Planning by L.R.Kadiyali and Lal- Khanna Publications.

REFERENCES:

1. Principles and Practice of Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
2. Text book of Highway Engineering by R.Srinivasa Kumar, Universities Press, Hyderabad.
3. Highway Engineering – Dr.S.K.Sharma, S.Chand Publishers

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------------|---|---|---|---|
| | GEOTECHNICAL ENGINEERING – II | 2 | 1 | 0 | 3 |

COURSE OBJECTIVE:

The objectives of this course are:

| | |
|---|---|
| 1 | To enable the student to determine different soil exploration techniques. |
| 2 | To enable the student to determine the earth slope stability. |
| 3 | To enable the student to estimate earth pressure using various theories. |
| 4 | To enable the student to estimate the contact pressure distribution below shallow footing and allowable bearing pressure. |
| 5 | To enable the student to analyze the load carrying capacity of pile foundation and well foundation. |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Understand different soil exploration techniques. |
| 2 | Analyze the earth slope stability. |
| 3 | Estimate earth pressure using various theories. |
| 4 | Estimate the contact pressure distribution below shallow footing and allowable bearing pressure. |
| 5 | Analyze the load carrying capacity of pile foundation and well foundation. |

UNIT – I

SOIL EXPLORATION: Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – Pressure meter – Planning of Programme and preparation of soil investigation report.

UNIT – II

EARTH SLOPE STABILITY: Infinite and finite earth slopes – Types of failures – Factor of safety of infinite slopes – Stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – III

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – Earth pressures in layered soils – Coulomb's earth pressure theory – Rebhann's and Cullman's graphical method

RETAINING WALLS: Types of retaining walls – stability of retaining walls.

UNIT – IV

SHALLOW FOUNDATIONS: Types – choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi's, Meyerhoff's and Skempton's Methods

ALLOWABLE BEARING PRESSURE: Safe bearing pressure based on N- value – Allowable bearing pressure; safe bearing capacity and settlement from plate load test – Allowable settlements of structures – Settlement Analysis

UNIT –V

PILE FOUNDATION: 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 – Settlement of pile groups.

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions and Design Criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Geotechnical Engineering by C.Venkataramaiah, New Age Publications.
2. Soil Mechanics and Foundation Engineering by Arora, Standard Publishers and Distributors, Delhi
3. Soil Mechanics and Foundations by – by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:

1. Soil Mechanics and Foundation Engineering by Purushtoma Raj, Pearson Publications
2. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
3. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.
4. Foundation Engineering by V.N.S.Murthy, CRC Press, New Delhi.
5. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
6. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.

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Semester-6 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-------------------------|---|---|---|---|
| | English Language Skills | 3 | 0 | 0 | 3 |

Course Description:

English Language Skills aims to enable the engineering students to meet the demands of the modern job market through thorough training in LSRW skills, presentation skills, interview skills, academic writing etc. Students of our region have knowledge of their respective subjects, but the surveys make it clear that they are lagging behind in expressing themselves effectively in a professional setting. So this course will enable them to hone these skills and excel in their respective fields.

COURSE OBJECTIVES

| | |
|---|--|
| 1 | To develop awareness in students of the relevance and importance of technical communication and presentation skills. |
| 2 | To prepare the students for placements |
| 3 | To sensitize the students to the appropriate use of non-verbal communication |
| 4 | To train students to use language appropriately for presentations and interviews |
| 5 | To enhance the documentation skills of the students with emphasis on formal and informal writing |

COURSE OUTCOMES

| | |
|-----|---|
| CO1 | To recall and memorize the basic concepts of effective communication |
| CO2 | To understand the various components of effective communication. |
| CO3 | To apply writing skills in order to meet the demands of work place environment. |
| CO4 | To analyze verbal and non-verbal interpretations in multicultural context. |
| CO5 | To evaluate different aspects of verbal and linguistic competence to become effective presenters. |
| CO6 | To design and develop an effective written documents in technical domain. |

UNIT 1: LSRW SKILLS

Introduction to LSRW Skills – Definition – Importance of LSRW Skills - Advantages and Disadvantages of Oral and Written Skills – Advantages and disadvantages of Written & Speaking skills - Barriers to effective communication

OUTCOMES

| |
|---|
| To recall and memorize the basic concepts of LSRW skills |
| To understand the various components of oral and written skills |
| To apply English language skills to avoid barriers to effective communication |

UNIT II: VERBAL & NON-VERBAL SKILLS

Informal and Formal Conversation - Non-verbal Skills–Kinesics, Proxemics, Chronemics, Haptics, Oculesics ,Paralinguistic features – Body language for interviews

| |
|---|
| To understand the basic components of non-verbal communication. |
| To apply the knowledge of the difference between informal and formal conversation in order to meet the demands of work place environment. |
| To analyze non-verbal interpretations in multicultural context. |

UNIT III: ACADEMIC WRITING SKILLS

Writing Skills–Art of condensation- summarizing and paraphrasing - Abstract Writing, Synopsis Writing – Formal Letter Writing - Report Writing

| |
|--|
| To understand the basic components of written communication. |
| To apply knowledge of different formats of written communication needed in work place environment. |
| To analyze the structure of letters, reports etc. |

UNIT IV: CREATIVE WRITING SKILLS

Film Review Writing – Creative Writing- Short Story Writing – Speeches for academic settings – Writing Skits – Script for Short Films/Web Series

| |
|--|
| To apply writing skills in creative writing to meet the demands of documentation in professional life |
| To analyze different figures of speech in creative writing |
| To evaluate different aspects creative and academic writing to become effective at written communication |

UNIT V: PROFESSIONAL SPEAKING SKILLS

Job Interviews –Types of Job Interviews – Characteristics of a job interview - Interview Preparation Techniques –How to overcome Stage fright

Group Discussions(GD): Importance of Group Discussion- Characteristics of a GD - GD as a tool for selection – GD Strategies – Do's & Don't of GD - GD Vs Debates

| |
|--|
| To analyze the different aspects of interviews and group discussions |
| To evaluate the group dynamics to excel in group discussions |
| To design and develop strategies to answer effectively in interviews |

Text Books:

1. **Effective Technical Communication**, Ashrif Rizvi, TataMcGrahill, 2011
2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, 3rd Edition, O U Press 2015

References:

1. **Communication Skills** by Pushpalatha & Sanjay Kumar, Oxford University Press
2. Books on **TOEFL/GRE/GMAT/CAT/IELTS** by Barron's/DELTA/Cambridge University Press. 2012.
3. **Soft Skills for Everyone**, Butterfield Jeff, Cengage Publications, 2011.
4. **Management Shapers Series** by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
5. **Successful Presentations** by John Hughes & Andrew Mallett, Oxford.
6. **Winning at Interviews** by Edgar Thorpe and Showick Thorpe, Pearson
7. **Winning Resumes and Successful Interviews** by Munish Bhargava, McGraw Hill

WEB LINKS

1. <https://blog.allaboutlearningpress.com/listening-comprehension/>
2. <https://www.englishclub.com/>
3. <https://www.helpguide.org/articles/relationships-communication/nonverbal-communication.htm>
4. <https://www.slideshare.net/poojavrs/lsw-109040479>
5. <https://www.slideshare.net/nandapalit/non-verbal-verbal-communication>
6. <https://www.slideshare.net/madeehasaheed96/writing-skills-71430610>
7. <https://www.slideshare.net/rhinautan/creative-writing-76208225>
8. <https://www.slideshare.net/vikkerkar/interview-skills-presentation>
9. <https://www.slideshare.net/ritikadhameja/group-discussion-46255658>

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B.Tech (R-19 Civil Engineering)
Semester-6 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------------|---|---|---|---|
| | PRESTRESSED CONCRETE (PEC-II) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|---|---|
| 1 | Understand the principles & necessity of prestressed concrete structures |
| 2 | Get the knowledge on various losses of prestress. |
| 3 | Analyse PSC beams with straight, concentric, eccentric, bent and parabolic tendons and design beams of rectangular and I section for flexure. |
| 4 | Design shear reinforcements, structural elements for shear, torsion and anchorage as per the provisions of BIS. |
| 5 | Interpret the transmission mechanism of pre-stressing force by bond and compute deflection of beams under loads |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|-----|--|
| CO1 | Understand the concepts of pre-stressing and methods of pre stressing. |
| CO2 | Compute losses of pre-stress in pre-stressed concrete members. |
| CO3 | Design PSC beams under flexure and shear.. |
| CO4 | Estimate the short- and long-term deflections of PSC beams. |
| CO5 | Apply prestressing concepts for composite beams. |

UNIT -I

Introduction:

Principles of pre-stressing – Pre stressing systems - Pre-tensioning and post tensioning- Advantages and limitations of Pre stressed concrete- Need for high strength materials. Methods of pre-stressing: Pre-tensioning (Hoyer system) and Post-tensioning methods (Freyssinet system and Gifford- Udall System).

UNIT –II

Losses of pre-stress:

Loss of pre-stress in pre-tensioned and post-tensioned members due to elastic shortening, shrinkage and creep of concrete, relaxation of stress in steel, anchorage slip and frictional losses.

UNIT -III

Flexure and shear:

Analysis of beams for flexure and shear - Beams pre-stressed with straight, concentric, eccentric,

bent and parabolic tendons- Kern line - Cable profile - Design of PSC beams (rectangular and I sections) using IS 1343. Analysis and design of rectangular and I beams for shear. Introduction to Transmission length and End block (no Design and Analytical problems).

UNIT – IV

Deflections:

Control of deflections- Factors influencing deflections - Short term deflections of uncracked beams- Prediction of long time deflections.

UNIT – V

Composite beams:

Different Types- Propped and Un-propped- stress distribution- Differential shrinkage- Analysis of composite beams.

TEXT BOOKS:

1. N. Krishna Raju, -Prestressed Concrete, Tata Mc.Graw Hill Publications.
2. Praveen Nagrajan, -Prestressed Concrete Design, Pearson publications, 2013.

REFERENCES:

1. T.Y. Lin & Ned H. Burns, —Design of Prestressed Concrete Structures, John Wiley & Sons.
2. Ramamrutham, -Prestressed Concrete, Dhanpatrai Publications.
3. Rajagopalan, -Prestressed concrete, Narosa Publishing House.
4. BIS code on -prestressed concrete, IS: 1343 to be permitted into the examination Hall.

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-------------------------------------|---|---|---|---|
| | EXPANSIVE SOILS
(PEC-II) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|--|
| 1 | Familiarize Students with Nature of Soils and Soil Structure |
| 2 | Equip student with concepts of Swelling and methods of determination |
| 3 | Understand foundation practices in expansive soils |
| 4 | Familiarize different materials and techniques for stabilization |
| 5 | Understand procedure to improve shear strength of expansive soils |

COURSE OUTCOMES:

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

| | |
|----|---|
| 1. | Demonstrate behavior of expansive soils. |
| 2. | Explain need of foundation practice on expansive soils. Perform methods of stabilization of expansive soils . |
| 3. | Select additives and methodology for stabilization. |
| 4. | Apply the gained knowledge for suitable performance |
| 5. | Understand procedure to improve shear strength of expansive soils |

UNIT – I

Clay Mineralogy: Nature of Soils-Clay mineral structure- Diffused double layer theory- Cation exchange – Soil water- Soil Structure-Soil water interaction

UNIT- II

Swelling Characteristics- Swelling- Factors effecting Swelling- Swelling Potential- Swell Pressure- Methods of Determination-Factors effecting Swelling potential and swell pressure- Heave- Factors effecting Heave- Methods of determination of heave.

UNIT-III

Foundation Practices in Expansive Clays: Sand Cushion-Belled Piers-CNS layer technique- Under reamed Pile foundation- Construction Techniques- Design Specifications- Load-carrying capacity in compressive and uplift of single and multi under reamed piles in clays and sands- Granular pile Anchors.

UNIT-IV

Stabilization:

Stone columns - Lime Slurry pressure injection & Stabilization with admixtures-Propounding-

Vertical and Horizontal Moisture barriers.

UNIT: V

Shear strength of expansive soils: Kati's concept of bilinear envelope- Stress –State variables in partially saturated soil s-Freund's strength parameters- Determination of matrix suction by filter paper method- Axis translation technique and field suction measurement.

TEXT BOOKS:

1. F. C. Chen, –Foundation on Expansive Soils, Elsevier Scientific Publishing Company, Newyork
2. J. D. Nelson and D. I. Miller, –Expansive soils- Problems and Practice in Foundation and pavement Engineering, John Wiley & Sons Inc

REFERENCES:

1. D. G. Fredlund and H. Rhardjo, –Soil Mechanics for Unsaturated Soils, WILEY Inter Science Publication, John Wiley & Sons, Inc
2. D. R. Katti, A. R. Katti, –Behavior of Saturated Expansive Soils and Control Methods, Taylor and Francis
3. Malcolm D Bolton , —Guide to Soil Mechanics, Universities Press, 2003.
4. Manfred R. Haussmann, –Engineering Principles of Ground Modification, McGraw Hill Pub. Co.,New, York, 1990

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | Repair and Rehabilitation of Structures
(PEC-II) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | To learn various distress and damages to concrete and masonry structures |
| 2 | To understand the importance of maintenance of structures |
| 3 | To assess the damage to structures using various tests |
| 4 | To study the various types and properties of repair materials |
| 5 | To learn various repair techniques of damaged structures, corroded structures |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|-----|---|
| CO1 | Understand the corrosion effects |
| CO2 | Understand the causes of deterioration in structures |
| CO3 | Assess the damaged structures using NDT techniques |
| CO4 | Understand the surface repair of structures |
| CO5 | Identify different types of strengthening and stabilization techniques used for existing structures |

Unit – I

Introduction, significance of corrosion, and corrosion mechanisms - Embedded metal corrosion

Unit – II

Deterioration of cementations systems – Sulphate and Acid attack - Alkali Silica Reaction (ASR), Shrinkage, and others

Unit – III

Concrete assessment using non-destructive tests (NDT) - : Concrete assessment and load effects

Unit – IV

Surface repair – Condition assessment – Analysis, strategy, and design – Material requirement, surface preparation, placement of repair material

Unit – V

Strengthening and stabilization -Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, leakage, earthquake-Transportation of Structures from one place to other -Structural Health Monitoring- demolition techniques-Engineered demolition methods-Case studies, Study of structural conditions of heritage buildings.

Text Books and references

- Concrete Repair and Maintenance by Peter H. Emmons, R.S. Means Company, Kingston, MA, USA.
- Maintenance Repair & Rehabilitation & Minor Works of Buildings P.C. Varghese, PHI Learning Pvt. Ltd., New Delhi.
- Concrete Repair to EN1504 – Diagnosis, Design, Principles and Practice Michael Raupach and Till Buttner, CRC Press., Taylor and Francis Group, Boca Raton, FL, USA
- Concrete Structures – Protection, Repair and Rehabilitation R. Dodge Woodson, Butterworth-Heinemann – Elsevier, UK

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | INDUSTRIAL WASTE AND WASTE WATER MANAGEMENT (OEC-II) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | To distinguish between the quality of domestic and industrial water requirements and Wastewater quantity generation. |
| 2 | To Know the industrial process, water utilization and waste water generation. |
| 3 | To Impart knowledge on selection of treatment methods for industrial wastewater. |
| 4 | To acquire the knowledge on operational problems of common effluent treatment plants. |
| 5 | To gain knowledge on different techniques and approaches for minimizing the generation and application of Physio-chemical and biological treatment methods for recovery, reuse and disposal of industrial wastewater. |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Distinguish between the quality of domestic and industrial water requirements and Wastewater quantity generation. |
| 2 | Understand the industrial process, water utilization and waste water generation |
| 3 | Acquire the knowledge on operational problems of common effluent treatment plants. |
| 4 | Impart knowledge on selection of treatment methods for industrial wastewater. |
| 5 | Understand the modern techniques skills and tools including computer applications, necessary for engineering practice. |

UNIT – I:

Sources of Pollution - Physical, Chemical, Organic & Biological properties of Industrial Wastes - Difference between industrial & municipal waste waters - Effects of industrial effluents on sewers and Natural water Bodies.

UNIT – II:

Pre & Primary Treatment - Equalization, Proportioning, Neutralization, Oil separation by Floating-Waste Reduction-Volume Reduction-Strength Reduction.

UNIT-III:

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

UNIT-IV:

Characteristics and Composition of waste water and Manufacturing Processes of Industries like Sugar, Characteristics and Composition of Industries like Food processing Industries, Steel, and

Petroleum Refineries.

UNIT-V:

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

TEXTBOOKS:

1. Metcalf & Eddy, -Wastewater engineering Treatment disposal reuse, Tata McGraw Hill.
2. Eckenfelder, W.W., -Industrial Water Pollution Control, McGraw-Hill

REFERENCE BOOKS:

1. M.N. Rao and Dutta – Industrial Waste.
2. Mark J. Hammer, Mark J. Hammer, Jr., -Water & Wastewater Technology, Prentice Hall of India.
3. N.L. Nemerrow –Theories and practices of Industrial Waste Engineering.
4. C.G. Gurnham –Principles of Industrial Waste Engineering.

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | INTELLECTUAL PROPERTY RIGHTS (OEC-II) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|---|---|
| 1 | Understanding, defining & differentiating types of intellectual properties (ips) and their roles in contributing to organizational competitiveness. |
| 2 | Understanding the frame work of strategic management of intellectual property |
| 3 | Appreciating and appraising different IP management approaches and describing how pioneering firms initiate, implement and manage IPM programs |
| 4 | Explaining how to derive value from IP and leverage its value in new product and service development |
| 5 | Exposing to the Legal management of IP and understanding of real life practice of IPM |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|----|--|
| 1. | Identify different types of intellectual properties (IPS), the right of ownership, scope of protection as well as the ways to create and to extract value from IP |
| 2. | Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development. |
| 3. | Identify activities and constitute IP infringements and the remedies available to the IPowner and describe the precautions to be taken to infringement of proprietary rights in products and technology development |
| 4. | Be familiar with the processes of Intellectual property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy. |
| 5. | Be able to anticipate and subject to critical analysis arguments relating to the development and reform of Intellectual property right institutions and their likely impact on creativity and innovation. |

UNIT – I

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

UNIT – II

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

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets: Trade secrets law, determination of trade secrets status, liability for misappropriations of trade secrets, and protection for submission, trade secrets litigation. Unfair competition: Misappropriation right of publicity, False advertising.

UNIT – V

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

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

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, cengagelearning.
2. Intellectual property right – nleashmy the knowledge economy, prabuddhaganguli, Tate Mc Graw Hill Publishing company ltd.,

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| SubjectCode | Title of the Subject | L | T | P | C |
|-------------|---------------------------------|---|---|---|---|
| | Green buildings (OEC-II) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|----|---|
| 1. | Exposure to the green building technologies and their significance. |
| 2. | Understand the judicious use of energy and its management. |
| 3. | Educate about the Sun-earth relationship and its effect on climate. |
| 4. | Enhance awareness of end-use energy requirements in the society. |
| 5. | Develop suitable technologies for energy management |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Understand the fundamentals of energy use and energy processes in building |
| 2 | Identify the energy requirement and its management. |
| 3 | Know the Sun-earth relationship vis-a-vis its effect on climate. |
| 4 | Be acquainted with the end-use energy requirements. |
| 5 | Be familiar with the audit procedures of energy. |

UNIT – 1:

Introduction What is Green Building, Why to go for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, What are key Requisites for Constructing a Green Building, Important Sustainable features for Green Building,

UNIT – 2:

Green Building Concepts And Practices Indian Green Building Council, Green Building Movement in India, Benefits Experienced in Green Buildings, Launch of Green Building Rating Systems, Residential Sector, Market Transformation; Green Building Opportunities And Benefits: Opportunities of Green Building, Green Building Features, Material and Resources, Water Efficiency, Optimum Energy Efficiency, Typical Energy Saving Approach in Buildings, LEED India Rating System and Energy Efficiency,

UNIT-3:

Green Building Design Introduction, Reduction in Energy Demand, Onsite Sources and Sinks, Maximize System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks,

Use of Renewable Energy Sources. Ecofriendly captive power generation for factory, Building requirement,

UNIT- 4:

Air Conditioning Introduction, CII Godrej Green business centre, Design philosophy, Design interventions, Energy modeling, HVAC System design, Chiller selection, pump selection, Selection of cooling towers, Selection of air handling units, Precooling of fresh air, Interior lighting system, Key feature of the building. Eco-friendly captive power generation for factory, Building requirement.

UNIT –5:

Material Conservation Handling of non process waste, waste reduction during construction, materials with recycled content, local materials, material reuse, certified wood, Rapidly renewable building materials and furniture; Indoor Environment Quality And Occupational Health: Air conditioning, Indoor air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements avoid use of asbestos in the building, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels,

Text Books:

1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.
2. Green Building Hand Book by Tom Woolley and Sam Kimings, 2009.
3. Complete Guide to Green Buildings by Trish Riley
4. Standard for the design for High Performance Green Buildings by Kent Peterson, 2009
5. Energy Conservation Building Code –ECBC-2020, published by BEE

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES: The objective of this course is

| | |
|---|---|
| 1 | To inculcate the basic knowledge of micro economics and financial accounting |
| 2 | To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost |
| 3 | To know the various types of Market Structures & pricing methods and its strategies |
| 4 | To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions. |
| 5 | To provide fundamental skills on Accounting and to explain the process of preparing Financial statements |

COURSE OUTCOMES: At the end of the course, students will be able to

| | |
|-----|---|
| CO1 | Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets |
| CO2 | Apply the Concept of Production cost and revenues for effective Business decision |
| CO3 | Analyze how to invest their capital and maximize returns. |
| CO4 | Evaluate the capital budgeting techniques |
| CO5 | Develop the accounting statements and evaluate the financial performance of business entity. |

UNIT-I: Managerial Economics

Introduction – Nature, meaning, significance, functions and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

LEARNING OUTCOMES: At the end of the Unit, the learners will be able to

- State the Nature of Managerial Economics and its importance
- Understand the concept of demand and its determinants
- Analyze the Elasticity and degree of elasticity
- Evaluate Demand forecasting methods
- Design the process of demand estimation for different types of demand

UNIT-II: Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function–

Least-cost combination– Shortrun and longrun Production Function- Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale. Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.

LEARNING OUTCOMES: At the end of the Unit, the learners will be able to

- Define the production function, Input-Output relationship and different cost concepts
- Apply the least-cost combination of inputs
- Analyze the behavior of various cost concepts
- Evaluate BEA for real time business decisions
- Develop profit appropriation for different levels of business activity

UNIT-III: Business Organizations and Markets

Introduction – Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition – Monopoly-Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

LEARNING OUTCOMES: At the end of the Unit, the learners will be able to

- Explain the structure of markets, features of different markets and forms of business organizations
- Apply the price output relationship in different markets
- Analyze the optimum output levels to maximize profit in different markets
- Evaluate price-output relationship to optimize cost, revenue and profit

UNIT- IV: Capital Budgeting

Introduction – Nature, meaning, significance, functions and advantages. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

LEARNING OUTCOMES: At the end of the Unit, the learners will be able to

- Explain the concept of capital budgeting and its importance in business
- Contrast and compare different investment appraisal methods
- Analyze the process of selection of investment alternatives using different appraisal methods
- Evaluate methods of capital budgeting for investment decision making and for maximizing returns
- Design different investment appraisals and make wise investments

UNIT-V: Financial Accounting and Analysis

Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions-

Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). ***Financial Analysis*** - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

LEARNING OUTCOMES:At the end of the Unit, the learners will be able to

- Discuss the concept, convention and significance of accounting
- Apply the fundamental knowledge of accounting while posting the journal entries
- Analyze the process and preparation of final accounts and financial ratios
- Evaluate the financial performance of an enterprise by using financial statements

Text Books:

1. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019

References:

1. Ahuja Hl Managerial economics Schand, 3/e, 2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | ENTREPRENEURSHIP & INCUBATION | 3 | 0 | 0 | 3 |

| COURSE OBJECTIVES: The objective of this course is | |
|---|---|
| 1 | To make the student understand about Entrepreneurship |
| 2 | To enable the student in knowing various sources of generating new ideas in setting up of new enterprise |
| 3 | To facilitate the student in knowing various sources of finance in starting up of a business |
| 4 | To impart knowledge about various government sources which provide financial assistance to entrepreneurs/ women entrepreneurs |
| 5 | To encourage the student in creating and designing business plans |

| COURSE OUTCOMES: At the end of the course, students will be able to | |
|--|---|
| 1 | Define the Concepts related to the Entrepreneurship and Incubators |
| 2 | Understand the concept of Entrepreneurship and challenges in the world of competition. |
| 3 | Apply the Knowledge in generating ideas for New Ventures. |
| 4 | Analyze various sources of finance and subsidies to entrepreneur/women Entrepreneurs. |
| 5 | Evaluate the role of central government and state government in promoting Entrepreneurship. |
| 6 | Create and design business plan structure through incubations. |

UNIT-I: Entrepreneurship

Introduction-Nature, meaning, significance, functions and advantages. concept, characteristics-knowledge and skills requirement - process - Factors supporting entrepreneurship - Differences between Entrepreneur and Intrapreneur - entrepreneurial mindset and personality - Recent trends.

LEARNING OUTCOMES

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

- Understand the concept of Entrepreneur and Entrepreneurship in India
- Analyze recent trends in Entrepreneurship across the globe
- Develop a creative mind set and personality in starting a business.

UNIT-II: Women Entrepreneurship

Introduction – Nature, meaning, significance, functions and advantages. Growth of women entrepreneurship in India. - Issues & Challenges - Entrepreneurial motivations. Entrepreneurship Development and Government. Role, of Central and State Government - incentives, subsidies and grants – Export-oriented Units - Fiscal and Tax concessions.

LEARNING OUTCOMES

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

- Understand the role of government in promoting women entrepreneurship
- Analyze the role of export-oriented units
- Evaluate the tax concessions available for Women entrepreneurs

UNIT-III:Product Development

Introduction – Nature, meaning, significance, functions and advantages. Startup Initiatives - Generating business/ Service idea – Sources and methods –Identifying opportunities - Feasibility study - Market feasibility, technical/operational feasibility, Financial feasibility. Developing business plan, Preparing project report, Presenting business plan to investors.

LEARNING OUTCOMES

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

- Analyze the sources of new methods in generating business idea
- Evaluate market feasibility, financial feasibility and technical feasibility
- Design and draw business plans in project preparation and prepare project reports

UNIT-IV:Startups

Introduction – Nature, meaning, significance, functions and advantages. Fundamentals of Business Incubation - Principles and good practices of business incubation- Process of business incubation and the business incubator and how they operate and influence the Type/benefits of incubators - Corporate/educational / institutional incubators - Broader business incubation environment - Pre-Incubation and Post - Incubation process - Idea lab, Business plan structure -Value proposition

LEARNING OUTCOMES

At the end of the Unit, the learners will be able to:

- Understand the importance of business incubation
- Apply brilliant ideas in the process of business incubation
- Analyze the process of business incubation/incubators.
- Design their own business incubation/incubators as viable-business unit.

UNIT-V: Finance

Introduction – Nature, meaning, significance, functions and advantages. Sources - Long term and Short term - Institutional Finance – Commercial Banks, SFC's and NBFC's in India, Role in small and medium business - Entrepreneurship development programs in India - The entrepreneurial journey- Institutions supporting entrepreneurship development.

LEARNING OUTCOMES

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

- Understand the various sources of finance in Starting the new venture
- Analyze the role of banks and other financial institutions in promoting entrepreneurship in India
- Evaluate the need and importance of MSMEs in the growth of country

TEXT BOOKS

1. D F Kuratko and T V Rao, **Entrepreneurship** - A South-Asian Perspective – Cengage Learning, 2012. (For PPT, Case Solutions Faculty may visit :login.cengage.com)
2. Nandan H, Fundamentals of Entrepreneurship, PHI, 2013

REFERENCES

1. Vasant Desai, Small Scale Industries and Entrepreneurship, Himalaya Publishing 2012.
2. Rajeev Roy Entrepreneurship, 2nd Edition, Oxford, 2012.
3. B. Janakiram and M. Rizwan, Entrepreneurship Development: Text & Cases, Excel Books, 2011.
4. Stuart Read, Effectual Entrepreneurship, Routledge, 2013.

E-RESOURCES

1. Entrepreneurship-Through-the-Lens-of-enture Capital
2. <http://www.onlinevideolecture.com/?course=mba-programs&subject=entrepreneurship>
3. http://nptel.ac.in/courses/122106032/Pdf/7_4.pdf
4. <http://freevideolectures.com/Course/3514/Economics/-/Management/-/Entrepreneurship/50>

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-6 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | BUSINESS ETHICS AND CORPORATE GOVERNANCE | 3 | 0 | 0 | 3 |

| COURSE OBJECTIVES : The objectives of this course are | |
|--|--|
| 1 | To make the student understand the principles of business ethics |
| 2 | To enable them in knowing the ethics in management |
| 3 | To facilitate the student's role in corporate culture |
| 4 | To impart knowledge about the fair-trade practices |
| 5 | To encourage the student in creating knowingabout the corporate governance |

| COURSE OUTCOMES: At the end of the course, students will be able to | |
|--|--|
| CO1 | Define the Ethics and Types of Ethics. |
| CO2 | Understand business ethics and ethical practices in management |
| CO3 | Understand the role of ethics in management |
| CO4 | Apply the knowledge in cross cultural ethics |
| CO5 | Analyze law and ethics |
| CO6 | Evaluate corporate governance |

UNIT-I:ETHICS

Introduction – Meaning – Nature, Scope, significance, Loyalty, and ethical behavior - Value systems - Business Ethics,Types, Characteristics, Factors, Contradictions and Ethical Practices inManagement- Corporate Social Responsibility – Issues of Management – Crisis Management.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the meaning of loyalty and ethical Behavior
- Explain various types of Ethics
- Analyze the corporate social responsibility of management

UNIT-II: ETHICS IN MANAGEMENT

Introduction Ethics in production,finance,,HumanResourceManagementand,Marketing,Managemen t - Technology Ethics and Professional ethics - The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the meaning of Marketing Ethics
- Compare and contrast technical ethics and professional ethics
- Develop ethical values

UNIT-III: CORPORATE CULTURE

Introduction, Meaning,definition,Nature, Scope, Functions,andsignificance– Cross cultural issues in Ethics - - Emotional Honesty – Virtue of humility – Promote happiness – karma yoga – proactive – flexibility and purity of mind. The Ethical Value System – Universalism, Utilitarianism, Distributive

Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

LEARNING OUTCOMES: -After completion of this unit student will

- Define Universalism Utilitarianism, Distributive
- Understand the corporate culture in business
- Analyze Ethical Value System Ethical Values in different Cultures

UNIT- IV:LEGAL FRAME WORK

Law and Ethics, Agencies enforcing Ethical Business Behavior, Legal Impact– Environmental Protection, Fair Trade Practices, legal Compliances, Safeguarding Health and wellbeing of Customers.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand Law and Ethics
- Analyze Different fair-trade practices
- Make use of Environmental Protection and Fair-Trade Practices

UNIT -V : CORPORATE GOVERNANCE

Introduction, meaning – scope Nature - Issues, need, corporate governance code, transparency & disclosure, role of auditors, board of directors and shareholders. Global issues, accounting and regulatory frame work, corporate scams, committees in India and abroad, corporate social responsibility. of BODs composition, Cadbury Committee - various committees - reports - Benefits and Limitations.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand corporate governance code
- Analyze role of auditors, board of directors and shareholders in corporate governance
- Implementing corporate social responsibility in India.

Text books.

1. Murthy CSV: Business Ethics and Corporate Governance, HPH
2. Bholanath Dutta, S.K. Podder – Corporation Governance, VBH.

Reference books

1. Dr. K. Nirmala, Karunakara Reddy : Business Ethics and Corporate Governance, HPH
2. H.R. Machiraju: Corporate Governance
3. K. Venkataramana, Corporate Governance, SHBP.
4. N.M. Khandelwal : Indian Ethos and Values for Managers

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--------------------------------------|---|---|---|-----|
| | ENVIRONMENTAL ENGINEERING LAB | 0 | 0 | 3 | 1.5 |

Course Objectives:

| | |
|----|---|
| 1. | The object of the course is to enable the students to identify the characteristics of water sample. |
|----|---|

Course Outcomes:

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

| | |
|----|--|
| 1. | Understand about quality of water and purification process |
| 2. | Select appropriate technique for treatment of waste water. |
| 3. | Assess the impact of air pollution |
| 4. | Understand consequences of solid waste and its management. |
| 5. | Design domestic plumbing systems. |

LABORATORY 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 & Wrinklers 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.

TEXT BOOKS:

1. G. S. Birdi –Water supply and sanitary Engineering, Dhanpat Rai & Sons Publishers.
2. Peavy, H.S, Rowe, D. R. Tchobanoglous, –Environmental Engineering, Mc-Graw –Hill International Editions, New York 1985.

REFERENCES:

1. B.C. Punmia, Ashok Jain & Arun Jain, –Water Supply Engineering, Vol. 1, Waste water Engineering, Vol. III, Laxmi Publications Pvt. Ltd, New Delhi.
2. MetCalf and Eddy. –Wastewater Engineering, Treatment, Disposal and Reuse, Tata McGraw-Hill, New Delhi.
3. S. M. Patil, —Plumbing Engineering. Theory, Design and Practice, 1999. K. N. Duggal, —Elements of environmental engineering, S. Chand Publishers.

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Semester-6 Syllabus

| Subject Code | Title of the Lab | L | T | P | C |
|--------------|-----------------------------|---|---|---|-----|
| | English Language Skills Lab | 0 | 0 | 3 | 1.5 |

Course Description:

English Language Skills Lab aims to enable the engineering students to meet the demands of the modern job market through group activities, individual presentations, mock interviews and group discussions. Students of our region have knowledge of their respective subjects, but the surveys make it clear that they are lagging behind in expressing themselves effectively in a professional setting. So, this course will enable them to hone these skills and excel in their respective fields.

| COURSE OBJECTIVES | |
|-------------------|---|
| 1 | To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts. |
| 2 | Further, they would be required to communicate their ideas relevantly and coherently in writing. |
| 3 | To prepare all the students for their placements. |
| 4 | To initiate them into greater use of the computer in resume preparation, report writing, format making etc. |
| 5 | To train them to use language effectively to face interviews, group discussions, public speaking. |

| COURSE OUTCOMES | |
|-----------------|--|
| CO1 | To recall and memorize tips to communicate effectively |
| CO2 | To understand various listening components that includes listening comprehension of gist and detailed information. |
| CO3 | To apply extensive and intensive reading methods for specific reading and voracious reading of vast material. |
| CO4 | To analyzedifferentdescriptive and technical writing material. |
| CO5 | To evaluate and develop, academic research paper with appropriate citations, quotations, and references when needed. |
| CO6 | To develop communicative competency and make the students job ready |

UNIT-I: COMMUNICATIVE COMPETENCY

1. Reading Comprehension
2. Listening comprehension
3. Vocabulary for competitive purpose

OUTCOMES:

- To recall and memorize the basic concepts of reading and listening skills
- To understand the various components to build up vocabulary
- To apply English language skills to avoid barriers to effective reading and listening

UNIT-II: TECHNICAL WRITING

1. Email Writing
2. CV/Resume Writing
3. Mini Project Writing

OUTCOMES:

- To understand the basic components of writing Emails
- To apply the knowledge of writing eye catching resumes
- To analyze different ways of writing a mini project

UNIT-III: ORAL PRESENTATION SKILLS

1. Self-Introduction – Introducing Others – Welcome Speech – Vote of Thanks
2. Oral Presentation-Individual/Impromptu Speeches/ JAM
3. Stage Dynamics– Barriers to Effective Presentation

OUTCOMES:

- To understand the basic components of speeches
- To apply knowledge of different forms of presentation.
- To analyze stage dynamics for effective presentation

UNIT-IV: TECHNICALPRESENTATION SKILLS

1. Information Transfer
2. PPT Presentation
3. Poster Presentation

OUTCOMES:

- To apply knowledge of different types of pictograms to transfer the information
- To analyze the techniques of preparing PPTs
- To evaluate different skills in poster presentation

UNIT-V: PROFESSIONAL SKILLS

1. Group discussions-II
2. Interview skills
3. Answering Strategies

OUTCOMES:

- To analyze the different aspects of interviews and group discussions
- To evaluate the group dynamics to excel in group discussions
- To design and develop strategies to answer effectively in interviews

MINIMUM REQUIREMENT FOR ELCS LAB:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 60 students in the lab:

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

SUGGESTED SOFTWARE:

1. Orell: Language Lab Software
2. Clarity Pronunciation Power – Part I (Sky Pronunciation)
3. Clarity Pronunciation Power – part II
4. LES(Learn English Select) by British council
5. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
6. English Pronunciation in Use (Elementary, Intermediate, Advanced) CUP
7. Cambridge Advanced Learners‘ English Dictionary with CD.

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

REFERENCE BOOKS

1. **DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.**
2. **TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)**
3. **Train2success.com**

1. **Objective English for Competitive Exams**, Hari Mohana Prasad, 4th edition, Tata Mc Graw Hill.

2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, O U Press 2009.
3. Books on **TOEFL/GRE/GMAT/CAT/IELTS** by Barron's/DELTA/Cambridge University Press.2012.
4. **Handbook for Technical Writing** by David A McMurrey& Joanne Buckely CENGAGE Learning 2008.
5. **English for Technical Communication for Engineering Students**, AyshaVishwamohan, Tata Mc Graw-Hill 2009.
6. **Word Power Made Handy**, Shalini Verma, S Chand Publications, 2011.
7. **Effective Technical Communication**, Ashrif Rizvi, TataMcGrahill, 2011.

WEB LINKS

- 1.<https://www.slideshare.net/ruschellecossid/reading-comprehension-56872438>
- 2.<https://www.slideshare.net/FiveEEE/listening-comprehension-40031081>
- 3.<https://www.slideshare.net/shrutisalunkhe2/english-for-competitive-exams>
- 4.<https://www.slideshare.net/nidhipandey16/email-writing-52942112>
- 5.<https://www.slideshare.net/aamirmuhammadaamir77/resume-writing-ppt>
- 6.[https://www.powershow.com/view/1d8cf2-OWFhN/Mini Project Report Writing Workshop powerpoint ppt presentation](https://www.powershow.com/view/1d8cf2-OWFhN/Mini_Project_Report_Writing_Workshop_powerpoint_ppt_presentation)
- 7.<https://www.slideshare.net/8788902/oral-presentations-28994496>
- 8.<https://www.slideshare.net/nandapalit/presentation-skills-33500438>
- 9.<https://www.slideshare.net/ritikadhameja/group-discussion-46255658>
- 10.<https://www.slideshare.net/vikkerkar/interview-skills-presentation>

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Semester-6 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|------------------------------|---|---|---|---|
| | CONSTITUTION OF INDIA | 3 | 0 | 0 | 0 |

| COURSE OBJECTIVES : The objective of this course is | |
|--|--|
| 1 | To Enable the student to understand the importance of constitution |
| 2 | To understand the structure of executive, legislature and judiciary |
| 3 | To understand philosophy of fundamental rights and duties |
| 4 | 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. |
| 5 | To understand the central-state relation in financial and administrative control |

| COURSE OUTCOMES: At the end of the course, students will be able to | |
|--|--|
| 1 | State the historical background of the constitution making and its importance for building a democratic India. |
| 2 | Understand the functioning of three wings of the governmentie., executive, legislative and judiciary. |
| 3 | Demonstrate the value of the fundamental rights and duties for becoming good citizen of India. |
| 4 | Analyze the decentralization of power between central, state and local self-government |
| 5 | Appraise the knowledge in strengthening of the constitutional institutions like CAG,Election Commission and UPSC for sustaining democracy. |
| 6 | Develop themselves as responsible citizens and pave way to build a democratic country. |

UNIT-IIntroduction 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.

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the concept of Indian constitution
- Apply the knowledge on directive principle of state policy
- Analyze the History and features of Indian constitution
- Learn about Preamble, Fundamental Rights and Duties

UNIT-IIUnion Government and its Administration

Structure of the Indian Union- Federalism - Centre-State relationship – President’s Role, power and position - PM and Council of ministers - Cabinet and Central Secretariat–LokSabha-RajyaSabha - The Supreme Court and High Court - Powers and Functions

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the structure of Indian government
- Differentiate between the state and central government
- Explain the role of President and Prime Minister
- Know the Structure of supreme court and High court

UNIT-III State Government and its Administration

Structure of the State Govt. -Governor - Role and Position -CM and Council of Ministers - State Secretariat-Organization Structure and Functions

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the structure of state government
- Analyze the role of Governor and Chief Minister
- Explain the role of State Secretariat
- Differentiate between structure and functions of state secretariat

UNIT-IV Local Administration

District's Administration Head - Role and Importance - Municipalities - Mayor and role of Elected Representatives -CEO of Municipal Corporation Panchayati Raj - Functions– PRI–Zilla Parishath - Elected officials and their roles – CEO, Zilla Parishath - Block level Organizational Hierarchy - (Different departments) - Village level - Role of Elected and Appointed officials - Importance of grass root democracy

LEARNING OUTCOMES:-After completion of this unit student will

- Understand the local Administration
- Compare and contrast district administration's role and importance
- Analyze the role of Mayor and elected representatives of Municipalities
- Learn about the role of Zilla Parishath block level organization

UNIT-V Election Commission

Election Commission- Role of Chief Election Commissioner and Election Commissionerate - State Election Commission -Functions of Commissions for the welfare of SC/ST/OBC and Women

LEARNING OUTCOMES:-After completion of this unit student will

- Know the role of Election Commission
- Contrast and compare the role of Chief Election commissioner and Commissionerate
- Analyze the role of state election commission
- Evaluate various commissions viz SC/ST/OBC and women

TEXT 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

REFERENCES:

1. J.A. Siwach, Dynamics of Indian Government & Politics,
2. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
3. J.C. Johari, Indian Government and Politics, Hans India
4. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd., New Delhi

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Semester-7 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-------------------------------|---|---|---|---|
| | FINITE ELEMENT METHODS | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|----|---|
| 1. | Implement the basics of FEM to relate stresses and strains |
| 2. | Formulate the design and heat transfer problems with application of FEM. |
| 3. | Solve 1 D, 2 D and dynamic problems using Finite Element Analysis approach |
| 4. | To impart preliminary knowledge of analyzing structures using finite element method. |
| 5. | To learn advanced methods of structural analysis and to apply these methods for analysis of indeterminate structures. |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand the fundamental ideas of FEM. |
| 2 | Develop shape functions and stiffness matrices for different elements |
| 3 | Generate global stiffness matrices and global load vectors |
| 4 | Develop a solution for Iso-parametric elements for 2D analysis |
| 5 | Understand the numerical integration and solution techniques in FEM |

UNIT-I

Introduction:

Concepts of FEM – Steps involved – Merits & Demerits – Energy principles – Discretization – Rayleigh – Ritz method of functional approximation. Principles of Elasticity: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and

Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT-II

One Dimensional & Two Dimensional Elements: Stiffness matrix for bar element – Shape functions – 1D and 2D elements – Types of elements for plane stress and plane strain analysis – Displacement models – Generalized coordinates – Shape functions – Convergent and compatibility requirements – Geometric invariance – Natural coordinate system – Area and volume coordinates

UNIT-III

Element stiffness matrix:

Generation of element stiffness and nodal load matrices for 3-node triangular element and four - noded rectangular elements.

UNIT-IV

Iso-parametric Formulation:

Iso-parametric elements for 2D analysis – Formulation of CST element, 4 – noded and 8-

noded Iso-parametric quadrilateral elements –Lagrangian and Serendipity elements.AXI-SYMMETRIC ANALYSIS: Basic principles-Formulation of 4-noded iso-parametric Axi-symmetric element.

UNIT-V

Solution techniques:

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

TEXT BOOK:

- 1.Tirupathi R Chandraputla, –Finite Element Analysis for Engineering and Technology, Universities Press Pvt Ltd, Hyderabad. 2003.
2. C. S. Krishna Murthy,–Finite Element analysis-Theory & Programming, Tata Mc.Graw Hill Publishers.

REFERENCES:

1. H.V. Lakshminarayana, –Finite element analysis and procedures in engineering, 3rd edition, Universities press, Hyderabad.
2. Robert D. Cook, Michael E Plesha, Concepts and applications of Finite Element Analysis, John Wiley & sons Publications
3. S. Rajasekharan, –Finite element analysis in Engineering Design, S. Chand Publications, New Delhi.

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Semester-7 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-----------------------------------|---|---|---|---|
| | DESIGN OF STEEL STRUCTURES | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|----|--|
| 1. | To introduce steel structures and its basic components |
| 2. | To introduce structural steel fasteners like welding and bolting |
| 3. | To design tension members, compression members, beams and beam-columns |
| 4. | To design column splices and bases |
| 5. | To design design the various steel structures. |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|-----|---|
| CO1 | Understand the basic concepts of Steel structures and design of Tension members |
| CO2 | Analyze and Design of compression members |
| CO3 | Analyze and design of beams |
| CO4 | Analyze and design of simple roof truss |
| CO5 | Analyze and design of Plate girder and Gantry girder |

UNIT – I

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

UNIT – II

Design of compression members – Buckling class – slenderness ratio / strength design – Laced – Battened columns –Column splice – Column base – Slab base.

UNIT – III

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

UNIT – IV

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

UNIT – V

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

Gantry Girder: Gantry girder impact factors – longitudinal forces, Design of Gantry girders.

Note: The students should prepare the following plates.

Plate 1 Detailing of simple beams

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

Plate 3 Detailing of Column including lacing and battens.

Plate 4 Detailing of Column bases – slab base and gusseted base
Plate 5 Detailing of steel roof trusses including particulars at joints.
Plate 6 Detailing of Plate girder including curtailment, splicing and stiffeners.

TEXT BOOKS

1. limit state design of Steel Structures by Subramanyam.N, Oxford University press, New Delhi
2. Limit State Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi.

REFERENCES

1. Structural Design and Drawing by N.Krishna Raju, University Press, Hyderabad.
2. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
3. Design of Steel Structures by Edwin Gaylord, Charles Gaylord, James Stallmeyer, Tata Mc.Graw-Hill, New Delhi.

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Semester-7 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | GROUND IMPROVEMENT TECHNIQUES
(PEC-III) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|---|--|
| 1 | Understand the fundamental concept of ground improvement techniques. |
| 2 | Apply knowledge of densification methods. |
| 3 | Understand the concepts of stabilization mechanical & chemical methods. |
| 4 | Impart knowledge of components of reinforced earth & design of reinforced earth walls. |
| 5 | Understanding the identification & foundation techniques. |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|----|--|
| 1. | Understand the Dewatering and grouting techniques |
| 2. | Understand the densification methods used in granular soils and Cohesive soils |
| 3. | Understand the ground Improvement methods used to stabilize soil. |
| 4. | Understand the reinforcement design principles and geosynthetic materials, functions and applications. |
| 5. | Identify the problems in Expansive soils |

UNIT – I

DEWATERING: Methods of de-watering- Sumps and interceptor ditches- Single, multi stage well points - Vacuum well points- Horizontal wells-foundation drains-blanket drains - Criteria for selection of fill material around drains –Electro-osmosis .

GROUTING: Objectives of grouting- Grouts and their properties- Grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- Post grout test.

UNIT – II

DENSIFICATION METHODS IN GRANULAR SOILS:-

In – situ densification methods in granular Soils:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

DENSIFICATION METHODS IN COHESIVE SOILS:–

In – situ densification methods in Cohesive soils:– Preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – III

STABILISATION: Methods of stabilization-mechanical-cement- Lime-bituminous-Chemical stabilization with calcium chloride, sodium silicate and gypsum

UNIT – IV

REINFORCED EARTH: Principles – Components of reinforced earth – Factors governing design of reinforced earth walls – Design principles of reinforced earth walls.

GEOSYNTHETICS: Geotextiles- Types, Functions and applications – Geogrids and geomembranes – Functions and applications.

UNIT – V

EXPANSIVE SOILS: Problems of expansive soils – Tests for identification – Methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – Under reamed piles.

TEXT BOOKS:

1. Haussmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Dr.P.Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi / University science press, New Delhi
3. NiharRanajan Patra. Ground Improvement Techniques, Vikas Publications, New Delhi

REFERENCES:

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

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | TRANSPORTATION ENGINEERING - II
(PEC-III) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVE:

The objectives of this course are:

| | |
|---|--|
| 1 | Ability to explain the components of permanent way and its components and their functions and requirements. |
| 2 | Ability to explain the geometric design elements of Railway track like cant, radius of curve and degree of curve etc..and their design components. |
| 3 | Ability to the Aircraft characteristics and their influence on various design elements of an Airport. |
| 4 | Ability to explain the concepts of runway orientation, Airport lighting, Airport components and their planning and geometric design of runways and taxiways. |
| 5 | Ability to explain the difference between ports and Harbours, types of Ports and Harbours, various facilities needed in Ports and Harbours and NavigationalAids for ships. |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|---|--|
| 1 | Understand the components of permanent way and its components and their functions and requirements. |
| 2 | Understand the geometric design elements of Railway track like cant, radius of curve and degree of curve etc..and their design components. |
| 3 | understand the Aircraft characteristics and their influence on various design elements of an Airport. |
| 4 | Understand the concepts of runway orientation, Airport lighting, Airport components and their planning and geometric design of runways and taxiways. |
| 5 | Understand the difference between ports and Harbours, types of Ports and Harbours, various facilities needed in Ports and Harbours and NavigationalAids for ships. |

Unit – I

Railway Engineering:

Introduction – Permanent way components – Cross section of permanent way – Functions and requirements of rails, sleepers and ballast – Types of gauges – Creep of rails – Theories related to creep – Coning of wheels – adzing of sleepers – Rail fastenings.

Unit – II

Geometric design of railway track

Gradients – Grade compensation – Cant and negative super elevation – Cant deficiency – Degree of curves – Safe speed on railway track – Points and crossings – Layout and functioning of left hand turn out and right hand turn outs – Station yards – Signaling and interlocking.

Unit –III

Airport Engineering

Airport site selection – Factors affecting site selection and surveys- Runway orientation – Wind rose diagram – basic runway length – Correction for runway length – Terminal area – Layout and functions – Concepts of terminal building – Simple building , Linear concept, pier concept and satellite concept – Typical layouts .

Unit – IV

Geometric design of runways and taxiways

Aircraft characteristics – Influence of characteristics on airport planning and design – Geometric design elements of runway – Standards and specifications - Functions of taxiways – Taxiway geometric design – Geometric elements and standard specifications – Runway and taxiway lighting.

Unit – V

Ports and Harbors

Requirements of ports and harbors – Types of ports – Classification of harbors – Docks and types of docks – Dry docks, wharves and jetties – Breakwaters: layouts of different types of harbors and docks – Dredging operations – navigation aids.

Text books:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Satish Chandra and Agarwal, M.M. (2007) –Railway Engineering|| Oxford Higher Education, University Press New Delhi.
3. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.
4. A Text book of Transportation Engineering – S.P.Chandola – S.Chand& Co. Ltd. – (2001).
5. Railway Track Engineering by J.S.Mundrey

References:

1. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian, Scitechpublishers.
2. Harbour, Dock and Tunnel Engineering – R. Srinivasan, Charotar Publishing House Pvt. Limited, 2009
3. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza, Chartor Publishers pvt ltd.

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(PEC-III) | 3 | 0 | 0 | 3 |

Course Objective:

To know the design and drawing aspects of Sloping glacis weir, Tank sluice with tower head, Type III Siphon aqueduct, Surplus weir, Trapezoidal notch fall and Canal regulator.

- Sloping glacis weir.
- Tank sluice with tower head
- Type III Siphon aqueduct.
- Surplus weir.
- Trapezoidal notch fall.
- Canal regulator.

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

Course Outcomes:

On completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Design and draw the plan and cross section of Sloping glacis weir. |
| 2 | Design and draw the plan and cross section of Tank sluice with tower head |
| 3 | Design and draw the plan and cross section of Type III Syphon aqueduct |
| 4 | Design and draw the plan and cross section of Surplus weir. |
| 5 | Design and draw the plan and cross section of Trapezoidal notch fall and Canal regulator. |

TEXT BOOKS:

1. C.Satyanarayana Murthy, –Design of minor irrigation and canal structures, Wiley eastern Ltd.
2. S.K.Garg, –Irrigation engineering and Hydraulic structures Standard

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | AIR POLLUTION AND CONTROL
(OEC-III) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|---|--|
| 1 | To teach the basics of air pollution |
| 2 | To impart the behavior of air due to metrological influence |
| 3 | To teach the pollutant dispersion models and how to control the particulates |
| 4 | To throw light on air quality management |
| 5 | To teach the design of air pollution control methods |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand the knowledge of air pollution, sources, types, lapse rate and decreasing measures |
| 2 | Understand and analysis air quantity sample and monitoring of pollution |
| 3 | Understand the types and nature of air pollutions, the behaviour of flumes and relevant metrological determinants influencing the dispersion of air pollutants. |
| 4 | Learn the design principles of particulate and gaseous control. |
| 5 | Evaluate air quantity management and analyse the causes and their effects of air pollutions. |

UNIT – I

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

EFFECTS OF AIR POLLUTION :Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT-II

THERMODYNAMIC OF AIR POLLUTION:

Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like Sox, Nox, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.

PLUME BEHAVIOUR : Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams.

UNIT-III

POLLUTANT DISPERSION MODELS : Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

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

UNIT – IV

CONTROL OF GASEOUS POLLUTANTS: General Methods of Control of Nox and Sox emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT – V

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

TEXT BOOKS:

1. Air Quality by Thodgodish, Levis Publishers, Special India Edition, New Delhi
2. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
3. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

1. An introduction to Air pollution by R.K.Trivedy and P.K. Goel, B.S. Publications.
2. Air Pollution and Control by K.V.S.G.Murali Krishna, Kousal& Co. Publications, New Delhi.
3. Environmental meteorology by S.Padmanabhammurthy , I.K.Internationals Pvt Ltd,New Delhi.

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | ENVIRONMENTAL ECONOMICS
(OEC-III) | 3 | 0 | 0 | 3 |

Course Objectives:

The objectives of this course are:

| | |
|----|--|
| 1. | To impart knowledge on sustainable development and economics of energy |
| 2. | To teach regarding environmental degradation and economic analysis of degradation |
| 3. | To inculcate the knowledge of economics of pollution and their management |
| 4. | To demonstrate the understanding of cost benefit analysis of environmental resources |
| 5. | To make the students to understand principles of economics of biodiversity |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand the information on sustainable development and economics of energy |
| 2 | Understand the information regarding environmental degradation and economic analysis of degradation |
| 3 | Understand the identification of economics of pollution and their management |
| 4 | Understand the cost benefit analysis of environmental resources |
| 5 | Understand the principles of economics of biodiversity |

UNIT- I

Sustainable Development: Introduction to sustainable development - Economy-Environment inter-linkages - Meaning of sustainable development - Limits to growth and the environmental Kuznets curve – The sustainability debate - Issues of energy and the economics of energy – Nonrenewable energy, scarcity, optimal resources, backstop technology, property research, externalities, and the conversion of uncertainty.

UNIT- II

Environmental Degradation: Economic significance and causes of environmental degradation - The concepts of policy failure, externality and market failure - Economic analysis of environmental degradation – Equi –marginal principle.

UNIT- III

Economics of Pollution: Economics of Pollution - Economics of optimal pollution, regulation, monitoring and enforcement - Managing pollution using existing markets: Bargaining solutions – Managing pollution through market intervention: Taxes, subsidies and permits.

UNIT- IV

Cost – Benefit Analysis: Economic value of environmental resources and environmental damage - Concept of Total Economic Value - Alternative approaches to valuation – Cost-benefit analysis and discounting.

UNIT – V

Economics of biodiversity: Economics of biodiversity conservation - Valuing individual species

and diversity of species -Policy responses at national and international levels. Economics of Climate Change – stern Report

Reference Books:

1. D.W. Pearce, A. Markandya and E.B. Barbier — Blueprint for a Green Economy, Earthscan, London. (1989),
2. R.K. Turner, D.W. Pearce and I. Bateman — Environmental Economics: An Elementary Introduction, Harvester Wheatsheaf, London. (1994),
3. D.W. Pearce and R.K. Turner — Economics of Natural Resources and the Environment, Harvester Wheatsheaf, London. (1990),
4. Michael S. Common and Michael Stuart — Environmental and Resource Economics: An Introduction, 2nd Edition, Harlow: Longman. (1996),
5. Roger Perman, Michael Common, Yue Ma and James McGilvray — Natural Resource and Environmental Economics, 3rd Edition, Pearson Education. (2003),
6. N. Hanley, J. Shogren and B. White — An Introduction to Environmental Economics, Oxford University Press. (2001),

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | DISASTER MANAGEMENT
(OEC-III) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|----|---|
| 1. | To give knowledge types of disasters and stages in disaster rehabilitation process. |
| 2. | To make awareness on change in climates and their impacts on occurrence of environmental disasters. |
| 3. | To impart knowledge on Consideration of wind and water effects as per codal provisions to withstand disasters. |
| 4. | To familiarize the student with the Causes of earthquake and their effects and remedial methods to be adopted for buildings. |
| 5. | To illustrate the methodology in Planning and design considerations of various structures constructing in disaster prone areas. |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|----|---|
| 1. | Understand about various types of disasters and stages in disaster rehabilitation process. |
| 2. | Impact of change in climates and their impacts on occurrence of environmental disasters. |
| 3. | Adopting suitable codal provisions to study the effect of wind and water effects on various structures constructed at disaster prone areas. |
| 4. | Understand the causes of earthquake and their effects and remedial methods to be adopted for buildings. |
| 5. | Adopt suitable Planning and design considerations of various structures constructing in disaster prone areas. |

Unit-I

Brief introduction to different types of natural disaster, Occurrence of disaster in different climatic and geographical regions, hazard (earthquake and cyclone) map of the world and India, Regulations for disaster risk reduction, Post disaster recovery and rehabilitation (socioeconomic consequences)

Unit-II

Climate change and its impact on tropical cyclone, Nature of cyclonic wind, velocities and pressure, Cyclone effects, Storm surge, Floods, Landslides. Behavior of structures in past cyclones and wind storms, case studies. Cyclonic retrofitting, strengthening of structures and adaptive sustainable reconstruction. Life-line structures such as temporary cyclone shelter.

Unit-III

Basic wind engineering, aerodynamics of bluff bodies, vortex shedding and associated unsteadiness along and across wind forces. Lab: Wind tunnel testing, its salient features. Introduction to Computational fluid dynamics. General planning/design considerations under wind storms & cyclones; Wind effects on buildings, towers, glass panels etc, & wind resistant features in design.

Codal Provisions, design wind speed, pressure coefficients; Coastal zoning regulation for construction & reconstruction phase in the coastal areas, innovative construction material & techniques, traditional construction techniques in coastal areas.

Unit-IV

Causes of earthquake, plate tectonics, faults, seismic waves; magnitude, intensity, epicenter, energy release and ground motions. Earthquake effects – On ground, soil rupture, liquefaction, landslides. Performance of ground and building in past earthquakes: Behavior of various types of buildings, structures, and collapse patterns; Behavior of Non-structural elements like services, fixtures, mountings- case studies. Seismic retrofitting- Weakness in existing buildings, aging, concepts in repair, restoration and seismic strengthening.

Unit-V

General Planning and design consideration; Building forms, horizontal and vertical eccentricities, mass and stiffness distribution, soft storey etc.; Seismic effects related to building configuration. Plan and vertical irregularities, redundancy and setbacks. Various Types and Construction details of: Foundations, soil stabilization, retaining walls, plinth fill, flooring, walls, openings, roofs, terraces, parapets, boundary walls, under-ground – overhead tanks, staircases and isolation of structures; innovative construction material and techniques; Local practices: traditional regional responses; Computational investigation techniques.

Text Books / References:

1. Disaster Management by Rajib Shah, Universities Press, India, 2003
2. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
3. Abbott, L. P. (2013). *Natural disasters*. 9th Ed. McGraw-Hill.
4. Agarwal, P. and Shrikhande, M. (2009). *Earthquake Resistant Design of Structures*. New Delhi : PHI Learning.
5. Bankoff, G., Frerks, G. and Hilhorst, D. (2004). *Mapping Vulnerability: Disasters, Development and People*. London : Earthscan.
6. Dutta, S. C. and Mukhopadhyay, P. (2012). *Improving Earthquakes and Cyclone Resistance of Structures: Guidelines for the Indian Subcontinent*. TERI.
7. ICIMOD. (2007). *Disaster Preparedness for Natural Hazards: Current Status in India*. Kathmandu : ICIMOD.
8. Simiu E. and Scanlan R. H. (1996). *Wind Effects on Structures-Fundamentals and Applications to Design*. 3rd Edn., John Wiley.
9. Sinha, P. C. (2006). *Disaster Mitigation, preparedness, recovery and Response*. New Delhi : SBS Publishers.
10. World Bank. (2009). *Handbook for Reconstructing after Natural Disasters*.

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-------------------------------|---|---|---|---|
| | MANAGEMENT
SCIENCE | 3 | 0 | 0 | 3 |

| COURSE OBJECTIVES: The objectives of this course are | |
|---|---|
| 1 | To provide fundamental knowledge on Management, Administration, Organization & its concepts. |
| 2 | To make the students understand the role of management in Production |
| 3 | To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, job evaluation and Merit rating concepts |
| 4 | To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management |
| 5 | To make the students aware of the contemporary issues in management |

| COURSE OUTCOMES: At the end of the course, students will be able to | |
|--|---|
| CO1 | Understand the concepts & principles of management and designs of organization in a practical world. |
| CO2 | Apply the knowledge of Work-study principles & Quality Control techniques in industry. |
| CO3 | Analyze the concepts of HRM in Recruitment, Selection and Training & Development. |
| CO4 | Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT |
| CO5 | Create Modern technology in management science |

UNIT-I:INTRODUCTION TO MANAGEMENT

Management-Concept and meaning-Nature-Functions-Management as a Science and Art and both. Schools of Management Thought-Taylor's Scientific Theory-Henry Fayol's principles-Elton Mayo's Human relations-Systems Theory- **Organizational Designs**-Line organization-Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form of Organization-Social responsibilities of Management.

LEARNING OUTCOMES:At the end if the Unit, the learners will be able to

- Understand the concept of management and organization
- Analyze the organization chart & structure for an enterprise.
- Apply the concepts & principles of management in real life industry.
- Evaluate and interpret the theories and the modern organization theory.

UNIT-II:OPERATIONSMANAGEMENT

Principles and Types of Plant Layout-Methods of Production (Job, batch and Mass Production), Work Study- Statistical Quality Control- Deming's contribution to Quality. **Materials Management** - Objectives- Inventory-Functions - Types, Inventory Techniques-EOQ-ABC Analysis-Purchase Procedure and Stores Management- **Marketing Management** -Concept-Meaning - Nature-Functions of Marketing - Marketing Mix- Channels of Distribution - Advertisement and Sales Promotion- Marketing Strategies based on Product Life Cycle.

LEARNING OUTCOMES:At the end of the Unit, the learners will be able to

Understand the core concepts of Management Science and Operations Management

- Apply the knowledge of Quality Control, Work-study principles in real life industry.
- Analyze Marketing Mix Strategies for an enterprise
- Evaluate Materials departments & Determine EOQ
- Create and design advertising and sales promotion

UNIT-III:HUMAN RESOURCES MANAGEMENT (HRM)

HRM- Evolution of HRM - Definition and Meaning – Nature-Managerial and Operative functions-- Job Analysis -Human Resource Planning (HRP)–Process of Recruitment&Selection - Training and Development-Performance Appraisal-Methods of Performance Appraisal – Placement-Employee Induction-Wage and Salary Administration.

LEARNING OUTCOMES:At the end if the Unit, the learners will

- Understand the concepts of HRM in Recruitment, Selection, Training & Development
- Apply Managerial and operative Functions
- Analyze the need of training
- Evaluate performance appraisal
- Design the basic structure of salaries and wages

UNIT-IV:STRATEGIC& PROJECT MANAGEMENT

Strategy Definition& Meaning-Vision - Mission- Goals- Corporate Planning Process-Environmental Scanning-Steps in Strategy Formulation and Implementation-SWOT Analysis

Project Management- Network Analysis- Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost Analysis - Project Crashing (Simple problems).

LEARNING OUTCOMES: At the end of the Unit, the learners will be able to

- Understand Mission, Objectives, Goals & strategies for an enterprise
- Apply SWOT Analysis to strengthen the project
- Analyze Strategy formulation and implementation
- Evaluate PERT and CPM Techniques
- Creative in completing the projects within given time

UNIT -V:Contemporary Issues In Management

The concept of Management Information System (MIS)- Materials Requirement Planning (MRP)- Customer Relations Management (CRM)- Total Quality Management (TQM)- Six Sigma Concept- Supply Chain Management (SCM)- Enterprise Resource Planning (ERP)- Performance Management- Business Process Outsourcing (BPO) - Business Process Re-engineering and Bench Marking -Balanced Score Card-Knowledge Management.

LEARNING OUTCOMES

At the end if the Unit, the learners will be able to

- Understand modern management techniques
- Apply Knowledge in Understanding in modern
- Analyze CRM,MRP,TQM
- Evaluate Six Sigma concept and SCM

Text Books:

1. A.R Aryasri, Management Science, TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education, New Delhi, 2012.

References:

1. Koontz & Weihrich, Essentials of Management, 6/e, TMH, 2005.
2. Thomas N.Duenning& John M.Ivancevich, Management Principles and Guidelines, Biztantra.
3. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
4. Samuel C.Certo, Modern Management, 9/e, PHI, 2005

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---------------------------------|---|---|---|---|
| | ORGANIZATIONAL BEHAVIOUR | 3 | 0 | 0 | 3 |

| COURSE OBJECTIVES: | |
|--------------------|--|
| 1 | To enable student's comprehension of organizational behaviour |
| 2 | To offer knowledge to students on self-motivation, leadership and management |
| 3 | To facilitate them to become powerful leaders |
| 4 | To Impart knowledge about group dynamics |
| 5 | To make them understand the importance of change and development |

| COURSE OUTCOMES: At the end of the course, students will be able to | |
|---|--|
| 1 | Define the Organizational Behavior, its nature and scope. |
| 2 | Understand the nature and concept of Organizational behavior |
| 3 | Apply theories of motivation to analyze the performance problems |
| 4 | Analyze the different theories of leadership |
| 5 | Evaluate group dynamics |
| 6 | Develop as powerful leader |

Unit-I: Introduction

, Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective -Understanding Individual Behavior –Attitude -Perception - Learning – Personality.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the concept of Organizational Behavior
- Contrast and compare Individual & Group Behavior and attitude
- Evaluate personality types

Unit-II: Motivation and Leading

Theories of Motivation- Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory - Vroom's theory of expectancy - McClelland's theory of needs - McGregor's theory X and theory Y - Adam's equity theory - Locke's goal setting theory - Alderfer's ERG theory - Leadership - research, theories, traits - Leaders Vs Managers.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the concept of Motivation
- Analyze the Theories of motivation
- Explain how employees are motivated according to Maslow's Needs Hierarchy

Unit-III: Organizational Culture

Introduction – Meaning, scope, definition, Nature - Organizational Climate - Leadership - Traits Theory - Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management - Evaluating Leader- Women and Corporate leadership.

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the concept of Leadership
- Contrast and compare Trait theory and Managerial Grid
- Distinguish the difference between Transactional and Transformational Leadership

- Evaluate the qualities of good leaders

Unit-IV:Group Dynamics

Introduction – Meaning, scope, definition, Nature- Types of groups - Determinants of group behavior - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - Team building - Conflict in the organization– Conflict resolution

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the concept of Group Dynamics
- Contrast and compare Group behavior and group development
- Evaluate how to resolve conflicts in the organization

Unit-V:Organizational Change and Development

Introduction –Nature, Meaning, scope, definition and functions- Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management – Managerial implications of organization's change and development

LEARNING OUTCOMES: -After completion of this unit student will

- Understand the importance of organizational change and development
- Apply change management in the organization
- Analyze work stress management
- Evaluate Managerial implications of organization

TEXT BOOKS:

1. Luthans, Fred, Organisational Behaviour, McGraw-Hill, 12 Th edition 2011 2. P Subba Rao, Organisational Behaviour, Himalya Publishing House 2017

References

- McShane, Organizational Behaviour, TMH 2009
- Nelson, Organisational Behaviour, Thomson, 2009.
- Robbins, P. Stephen, Timothy A. Judge, Organisational Behaviour, Pearson 2009.
- Aswathappa, Organisational Behaviour, Himalaya, 2009

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-----------------------------|---|---|---|---|
| | Business Environment | 3 | 0 | 0 | 3 |

| Course Objectives | |
|--------------------------|--|
| 1 | To make the student understand about the business environment |
| 2 | To enable them in knowing the importance of fiscal and monetary policy |
| 3 | To facilitate them in understanding the export policy of the country |
| 4 | To Impart knowledge about the functioning and role of WTO |
| 5 | To Encourage the student in knowing the structure of stock markets |

| COURSE OUTCOMES: At the end of the course, students will be able to | |
|--|--|
| 1 | Define Business Environment and its Importance. |
| 2 | Understand various types of business environment. |
| 3 | Apply the knowledge of Money markets in future investment |
| 4 | Analyze India's Trade Policy |
| 5 | Evaluate fiscal and monetary policy |
| 6 | Develop a personal synthesis and approach for identifying business opportunities |

Unit-I: Overview of Business Environment

Introduction – meaning Nature, Scope, significance, functions and advantages. Types- Internal & External, Micro and Macro. Competitive structure of industries -Environmental analysis- advantages & limitations of environmental analysis & Characteristics of business.

Learning Outcomes: -After completion of this unit student will

- Understand the concept of Business environment
- Classify various types of business environment
- Evaluate the environmental analysis in business
- Discuss the Characteristics of Business.

Unit-II: Fiscal Policy

Introduction – Nature, meaning, significance, functions and advantages. Public Revenues - Public Expenditure - Public debt - Development activities financed by public expenditure - Evaluation of recent fiscal policy of GOI. Highlights of Budget- Monetary Policy - Demand and Supply of Money –RBI -Objectives of monetary and credit policy - Recent trends- Role of Finance Commission.

Learning Outcomes: -After completion of this unit student will

- Understand the concept of public revenue and public Expenditure
- Identify the functions of RBI and its role
- Analyze the Monetary policy in India
- Know the recent trends and the role of Finance Commission in the development of our country
- Differentiate between Fiscal and Monetary Policy

Unit-III: India's Trade Policy

Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral TradeAgreements - EXIM policy and role of EXIM bank -Balance of Payments– Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.

Learning Outcomes: -After completion of this unit student will

- Understand the role of Indian international trade
- Understand and explain the need for Export and EXIM Policies
- Analyze causes for Disequilibrium and correction measure
- Differentiate between Bilateral and Multilateral Trade Agreements

UNIT-IV:World Trade Organization

Introduction – Nature, meaning, significance, functions and advantages. Organization and Structure - Role and functions of WTO in promoting world trade - Agreements in the Uruguay Round – TRIPS, TRIMS, and GATT - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.

Learning Outcomes: -After completion of this unit student will

- Understand the role of WTO in trade
- Analyze Agreements on trade by WTO
- Understand the Dispute Settlement Mechanism
- Compare and contrast the Dumping and Anti-dumping Measures.

Unit-V:Money Markets And Capital Markets

Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI - StockExchanges - Investor protection and role of SEBI.

Learning Outcomes: -After completion of this unit student will

- Understand the components of Indian financial system
- Know the structure of Money markets and Capital markets
- Analyze the Stock Markets
- Apply the knowledge in future investments
- Understand the role of SEBI in investor protection.

TEXT BOOKS:

1. Francis Cherunilam (2009), International Business: Text and Cases, Prentice Hall of India.
2. K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises 13th Revised Edition.HPH2016

REFERENCE BOOKS:

- 1.K. V. Sivayya, V. B. M Das (2009), Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
2. Sundaram, Black (2009), International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.
3. Chari. S. N (2009), International Business, Wiley India.
Bhattacharya (2009), International Business, Excel Publications, New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-7 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|-----|
| | COMPUTER AIDED DESIGNING AND DRAFTING LAB | 0 | 0 | 3 | 1.5 |

Course Objectives:

| | |
|----|---|
| 1. | To make the student familiar with civil engineering softwares related to design and drawing |
|----|---|

Course Outcomes:

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

| |
|---|
| Design various civil engineering structural elements. |
|---|

STAAD PRO or Equivalent EXERCISES:

1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple tower Analysis and Design
6. One Way Slab Analysis & Design
7. Two Way Slab Analysis & Design
8. Column Analysis & Design

TEXT BOOK:

1. Computer Aided Design Lab Manual by Dr.M.N.Sesha Prakash And Dr.C.S.Suresh

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B.Tech (R-19 Civil Engineering)
Semester-7 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|------------------------------|---|---|---|-----|
| | HIGHWAY MATERIALS LAB | 0 | 0 | 3 | 1.5 |

Course Objectives:

1. Test the aggregates for their suitability for use in Road Construction
2. Understand the Test procedures for determination of Crushing Strength , Impact Value, Abrasion Value of Aggregates
3. Understand the Importance of Shape of aggregates and Test Procedures to determine the same
4. Able to Test Bitumen to find out the Penetration Value, Ductility Value, Softening Point and Fire and Flash Point
5. Find out the Optimum Bitumen Content in a Bituminous Concrete by Marshall Stability Test.

Course Outcomes:

1. Ability to conduct Tests on Aggregates for their suitability in Road Construction
2. Ability to conduct Tests on Bitumen to know its grade and suitability in Road Construction
3. Knowledge and Hands on experience on Laboratory Tests on Aggregates and Bitumen
4. Understanding of the Bituminous Concrete Mix Design Procedure
5. Overall knowledge about Highway Materials, Tests on them and Interpretation of Results

Laboratory Experiments:

TESTS ON ROAD AGGREGATES:

- Aggregate Crushing value Test.
- Aggregate Impact Test.
- Abrasion Test.
- Shape tests

TESTS ON BITUMINOUS MATERIALS:

- Penetration Test.
- Ductility Test.
- Softening Point Test.
- Flash and fire point tests.
- Demo on Marshall Stability Test on Bituminous Mixes

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B.Tech (R-19 Civil Engineering)
Semester-8 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | URBAN TRANSPORTATION
PLANNING(PEC-IV) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|----|---|
| 1. | To impart the knowledge and concepts of Urban Transportation Planning |
| 2. | To make the student to understand the concepts of Travel Demand Modelling |
| 3. | To make the student understand the Surveys required for Urban Transportation Planning |
| 4. | To familiarize the student with the concepts of Trip generation, Trip Distribution |
| 5. | To familiarize the student with the concepts of Mode Split and Traffic assignment |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|----|---|
| 1. | Making the student to realize the need for Transportation Planning |
| 2. | To familiarize the students with the surveys and data collection needed for Urban Transportation Infrastructure |
| 3. | Impart to the students, the concepts of Trip Generation, Trip distribution, Mode Split and Network assignment |
| 4. | Making the student technically suitable to take up a job as a Transportation Engineer |
| 5. | Making the student with the concepts of Mode Split and Traffic assignment |

UNIT-I:

Urban Transportation Planning And Travel Demand: Urban Issues, Travel Characteristics, Evolution Of Planning Process, Supply And Demand – Systems Approach. Overall Planning Process, Long Term Vs Short Term Planning. Travel Demand Function, Independent Variables, Travel Attributes, Assumptions In Travel Demand Estimation, Sequential, And Simultaneous Approaches, Aggregate And Disaggregate Techniques.

UNIT-II:

Data Collection And Inventories: Collection Of Data – Organization Of Surveys And Analysis, Study Area- Definition And Guidelines, Zoning Principles, Types And Sources Of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use Of Secondary Sources.

UNIT-III:

Trip Generation And Distribution : Definition Of Trip –Trip Characteristics- Types Of Trips-Home Based And Non-Home Based Trips – Factors Affecting Trip Making Behavior -Trip Generation Analysis:

Zonal Models, Category Analysis, Household Models, Trip Attraction Models.

UNIT IV:

Trip Distribution: Growth Factor Methods- Uniform Growth Factor – Average Growth Factor – Fraters Method– Advantages And Disadvantages Of Growth Factors. Gravity Model – Formulation and Calibration.

UNIT-V:

MODE CHOICE AND TRAFFIC ASSIGNMENT:

Mode Choice: Factors Affecting Mode Choice-Mode Choice Behavior - Competing Modes, Mode Split Curves, Models And Probabilistic Approaches-Use Of Diversion Curves.

Traffic Assignment: Basic Elements Of Transport Networks, Coding, Route Properties, Minimum Path, **Assignment Techniques:** All-Or-Nothing Assignment, Capacity Restraint Technique, Multiple Route Assignment. Basic Numerical Examples.

Text Books:

1. Kadiyali.L.R., _Traffic Engineering and Transportation Planning‘, Khanna Publishers, New Delhi.
2. Hutchinson, B.G, _Introduction to Urban System Planning‘, McGraw Hill.
3. Khisty C.J., _Transportation Engineering – An Introduction‘ Prentice Hall.
4. Papacostas, _Fundamentals of Transportation Planning‘, Tata McGraw Hill.

Reference Books:

1. Mayer M and Miller E, _Urban Transportation Planning: A decision oriented Approach‘, McGraw Hill.
2. Bruton M.J., _Introduction to Transportation Planning‘, Hutchinson of London.
3. Dicky, J.W., _Metropolitan Transportation Planning‘, Tata McGraw Hill.

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B.Tech (R-19 Civil Engineering)
Semester-8 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | BUILDING CONSTRUCTION PRACTICE
(PEC-IV) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|----|---|
| 1. | To Impart knowledge in investigation of soil condition, Deciding and design of suitable foundation for different structures |
| 2. | To examine the good materials to be used for the construction work |
| 3. | To teach to supervision of different types of masonry |
| 4. | To illustrate the methodology in selection of materials, design and supervision of suitable type of floor and roof. |
| 5. | To teach the methodology of constructing advances structures |

COURSE OUTCOMES:

On completion of the course, the students will be able to:

| | |
|---|---|
| 1 | Understand the property , use , advantage and disadvantage of diffent material used in construction |
| 2 | Understand the Internal Construction and Finishes |
| 3 | Understand the Construction of high rise buildings: |
| 4 | Understand the Concepts and components of bridges: |
| 5 | Understand the Construction of Power Generating Structures |

UNIT -I:

Structural Components:

Foundations – classification of Foundations – consideration in selection of foundation types – Masonry – Brick and block walls – Cavity walls – Damp-proof courses and membranes – Mortars – Arches and openings – Windows – Glass and glazing – Doors – Stairs – Types and Applications – Cladding to external walls – Flat roofs – Dormer windows – Formwork & Scaffolding – Precast concrete frames – Portal frames – Types – components – Framed structures – Components – Construction Procedure – Panel walls – National Standards.

UNIT -II:

Internal Construction and Finishes

Internal elements – Internal walls – Construction joints – Internal walls, fire protection –separating walls – Partitions – Plasters and plastering – Domestic floors and finishes – Sound insulation – Timber, concrete and metal stairs–Internal doors – Door – Fire resisting doors – Plasterboard ceilings – Suspended ceilings –Paints and painting – Components of Paints – Types of Paint – Considerations in Selecting Paints – Cement Paints – Oil Paints –Emulsion - Paints – Whitewash and Color wash – Application of Paints –Distempers – Varnishes – Safety –Joinery production – Composite boarding – National Standards.

UNIT- III:

Construction of high rise buildings:

Construction methods and techniques using different materials, Minerals, Admixtures in-situ concrete, Precast Concrete & Structural Steel, finished concrete, tunnel form, fire Fighting, Safety

& Hazards, and Job Safety Analysis. Innovative methods of construction – Slip form technology, Jump form technology, Aluform & Tunnel Form Technology, Dry wall technology, Plastering Machines.

UNIT -IV:

Concepts and components of bridges:

Bridges, Steel Bridges, Arch Bridges, Cantilever Bridges Segmental construction & Box Girders. Construction of special type of bridges such as cable stayed bridge, suspension and Pre-stressed Bridge, construction of foundation and Super structure. Construction of Metro Railway & Monorail - Underground and over ground structures, different methods and techniques of construction. Problems and solutions – during maintenance and upkeep of structures. Fire, Ventilation, Dewatering and power supply, Subsidence, Vibration etc., Concept of Mag-rail.

UNIT -V:

Construction of Power Generating Structures

Atomic Power stations, Thermal power stations- Generation Power Plants, Windmills, Transmission towers, Chimneys (single and multi-flue), cooling towers - Natural draft cooling towers (NDCT) & Induced draft cooling tower (IDCT), Ash handling system, Containment Structure, Electro Static Precipitator (ESP), Case study of Kaiga atomic power station, Madras atomic power station. Or Any other Case Study and Safety Hazards

TEXT BOOKS:

1. Roy Chudley and Roger Greeno, –Construction Technology, Prentice Hall, 2005.
2. Peurifoy, –Construction Planning, Equipment and methods, Tata McGraw Hill Publication

REFERENCES

1. Mahesh Varma, –Construction Equipment Planning and Applications.
2. Kumar Niraj Jha, - –Formwork for Concrete Structures, Mc Graw Hill Publication
3. Sushil Kumar –Building Materials and construction, 20th edition, reprint 2015, Standard Publishers
4. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, —Building Construction, Laxmi Publications (P) Ltd., New Delhi.

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B.Tech (R-19 Civil Engineering)
Semester-8 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | ADVANCED FOUNDATION ENGINEERING(PEC-IV) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|----|--|
| 1. | To impart how Meyerhof's general bearing capacity equations are important over Terzaghi's bearing capacity equation. |
| 2. | To teach special methods of computation of settlements and the corrections to be applied to settlements and to understand the advanced concepts of design of pile foundations. |
| 3. | To throw light on pile and well foundations. |
| 4. | To teach the difference between isolated and combined footings |
| 5. | To teach the determination of bearing capacity of mats and proportioning of footings. |

COURSE OUTCOMES :

On completion of the course, the students will be able to:

| | |
|----|--|
| 1. | Understand the knowledge on Meyerhof's general bearing capacity equations are important over Terzaghi's bearing capacity equation. |
| 2. | Understand the knowledge on special methods of computation of settlements and the correctionsto be applied to settlements and to understand the advanced concepts of design of pile foundations. |
| 3. | Understand the knowledge on light on pile and well foundations. |
| 4. | Understand the knowledge on the difference between isolated and combined footings |
| 5. | Understand the knowledge on proportioning of footings. |

Unit -I

SHALLOW FOUNDATIONS: General requirements of foundations. Types of shallow foundations and the factors governing the selection of type of shallow foundation. Bearing capacity of shallow foundations by Terzaghi's theory and Meyerhof's theory (derivation of expressions and solution to problems based on these theories). Local shear and general shear failure and their identification. Bearing capacity of isolated footing subjected to eccentric and inclined loads.

Bearing capacity of isolated footing resting on stratified soils- Analysis and structural design of R.C.C isolated, combined and strap footings.

Unit-II

Proportioning of isolated, combined, strap footings and mat foundations (Excluding RCC design). Settlement analysis of foundations resting on different soil

Unit -III

DEEPFOUNDATIONS:

Pile foundations-types of pile foundations. Estimation of bearing capacity of pile foundation by dynamic and static formulae. Bearing capacity and settlement analysis of pile groups. Negative skin Friction, Pile load tests.

Caissons and Well foundations – Elements of well foundation. Forces acting a on a well foundation. Depth and bearing capacity of well foundation. Design of individual components of

well foundation (Excluding RCC design). Lateral stability of well foundations. Problems associated with well sinking. Pneumatic caisson.

Unit- IV

SHEET PILE WALLS:

Cantilever sheet piles and anchored bulkheads, Earth Pressure diagram, Determination of depth of embedment in sands and clays-Timbering of Trenches – Earth Pressure Diagrams – Forces in struts. Types of coffer dams

Unit-V

FOUNDATIONS IN EXPANSIVE SOILS: Basic foundation problems associated with black cotton soils. Use of sand cushion and Cohesive Non Swelling (CNS) layer below shallow foundations. Stone column techniques-principles and execution. Under reamed piles-principle of functioning of under reamed pile-Bearing capacity of under reamed pile.

TEXT BOOKS:

1. Theory and Practice of Foundation Design by N. N. Som and S.C. Das, PHI publications
2. Foundation Design by W.C. Teng, Prentice Hall Publishers
3. Geotechnical Engineering by C. Venkatramaiah, New age International Pvt . Ltd, Delhi

Reference Books:

1. Soil mechanics and foundation Engg. By K.R. Arora, Standard Publishers and distributors, Delhi
2. Basic and Applied Soil mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, Delhi
3. Foundation engineering by Brijendra M. Das, Cengage publications, New Delhi.

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COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-8 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---------------------------------|---|---|---|---|
| | REMOTE SENSING & GIS | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are to:

| | |
|---|--|
| 1 | Apply the concepts of Photogrammetric and its applications such as determination of heights of objects on Terrain . |
| 2 | Understand the basic concept of Remote Sensing and know about different types of satellite and sensors. |
| 3 | Illustrate Energy interactions with atmosphere and with earth surface features, Interpretation of satellite and top sheet maps |
| 4 | Understand different components of GIS and Learning about map projection and coordinate system |
| 5 | Develop knowledge on conversion of data from analogue to digital and working with GIS software. |

COURSE OUTCOMES

On completion of the course, the students will be able to:

| | |
|----|--|
| 1. | Comparing 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. |

UNIT – I

Introduction to photogrammetric:

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

UNIT – II

Remote sensing:

Basic concepts and foundation of remote sensing – Elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III

Geographic information system:

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

mapping.

UNIT – IV

GIS spatial analysis:

Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – V

Water resources applications:

Land use/Land cover in water resources, Surface water mapping and inventory -Watershed management for sustainable development and Watershed characteristics - Reservoir sedimentation, Fluvial Geomorphology - Ground Water Targeting, Identification of sites for artificial Recharge structures - Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. B. Bhatta, -Remote Sensing and GIS, Oxford University Press, New Delhi.
2. Satheesh Gopi, Advanced surveying: Total station GIS and remote sensing, Pearson publication.

REFERENCES:

1. George Joseph, -Fundamentals of remote sensing, Universities press, Hyderabad.
2. C. P. Lo Albert, K.W. Yongg, -Concepts & Techniques of GIS, Prentice Hall (India) Publications.
3. M. Anji Reddy -Remote sensing and GIS, B. S. Publications, New Delhi.
4. L. R. A. Narayana, -Remote Sensing and its applications, University Press 1999.

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COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-8 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|--|---|---|---|---|
| | GLOBAL WARMING AND CLIMATIC CHANGES | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|---|--|
| 1 | To know the basics, importance of global warming. |
| 2 | To know about the layers of atmosphere and their characteristics |
| 3 | To know the impacts of climate changes |
| 4 | To know about the causes of climate change and carbon credits, effect of change in temperature and climate on India. |
| 5 | To know the concepts of mitigation measures against global warming |

COURSE OUTCOME

On completion of the course, the students will be able to:

| | |
|---|--|
| 1 | To identify the importance of Ozone and effect of greenhouse gases & To know the effect of global warming |
| 2 | To know about the layers of atmosphere and their characteristics |
| 3 | To know about the causes of climate change and its effects on various sectors. |
| 4 | To know about the causes of climate change and carbon credits, effect of change in temperature and climate on India. |
| 5 | To know about the clean technology, use of renewable energy, mitigation technologies and their practices. |

UNIT - I

EARTH'S CLIMATE SYSTEM:

Introduction to environment, Ozone, ozone layer and its functions, Ozone depletion and ozone hole, Vienna convention and Montreal protocol, Green house gases and green house effect, Hydrological cycle and Carbon cycle, Global warming and its impacts

UNIT - II

ATMOSPHERE & ITS COMPONENTS: Atmosphere and its layers - Characteristics of Atmosphere - Structure of Atmosphere - Composition of Atmosphere - Atmospheric stability - Temperature profile of the atmosphere - Temperature inversion and effects of inversion on pollution dispersion.

UNIT - III

IMPACTS OF CLIMATE CHANGE : Causes of Climate change - Change of Temperature in the environment - Melting of ice and sea level rise - Impacts of Climate Change on various sectors - Projected impacts for different regions, uncertainties in the projected impacts and risk of irreversible changes.

UNIT - IV

OBSERVED CHANGES AND ITS CAUSES: Climate change and Carbon credits- Clean Development Mechanism (CDM), CDM in India - Kyoto Protocol - Intergovernmental Panel on Climate Change (IPCC) - Climate Sensitivity - Montreal Protocol - United Nations Framework Convention on Climate Change (UNFCCC) - Global change in temperature and climate and changes within India

UNIT - V

CLIMATE CHANGE AND MITIGATION MEASURES: CDM and Carbon Trading - Clean Technology, biodiesel, compost, biodegradable plastics- Renewable energy usage as an alternative - Mitigation Technologies and Practices within India and around the world - Non-renewable energy supply to all sectors- Carbon sequestration- International and regional cooperation for waste disposal biomedical wastes, hazardous wastes, e-wastes, industrial wastes, etc.

REFERENCE BOOKS

1. Dash Sushil Kumar, -Climate Change- An Indian Perspective, Cambridge University Press India Private Limited 2007.
2. Adaptation and mitigation of climate change- Scientific Technical Analysis. Cambridge University Press, Cambridge, 2006.
3. Atmospheric Science, J.M. Wallace and P.V. Hobbs, Elsevier/Academic Press 2006.
4. Jan C. van Dam, Impacts of -Climate Change and Climate Variability on hydrological Regimes, Cambridge University Press, 2003.
5. David Archer, Global Warming: Understanding the Forecast, 2nd ed. (Wiley, 2011)
John Houghton, Global Warming: The Complete Briefing, 5th Edition, 2015
Cambridge Univ. Press

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COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)
Semester-8 Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | HEALTH, SAFETY AND ENVIRONMENTAL | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

The objectives of this course are:

| | |
|----|---|
| 1 | To understand safety, health and environmental management. |
| 2. | To be familiar with hazard classification and assessment, hazard evaluation and hazard . control, environmental issues and management |
| 3. | To get exposed to accidents modeling, accident investigation and reporting, concepts of. HAZOP and PHA |
| 4. | To be familiar with safety measures in design and process operations. |
| 5. | To get exposed to risk assessment and management, principles and methods |

COURSE OUTCOMES

On completion of the course, the students will be able to

| | |
|----|--|
| 1. | To understand safety, health and environmental management. |
| 2. | To be familiar with hazard classification and assessment, hazard evaluation and hazard. |
| 3. | To get exposed to accidents modelling, accident investigation and reporting control, environmental issues and management |
| 4. | To get concepts of HAZOP and PHA. |
| 5. | To be familiar with safety measures in design and process operations. |

Unit – I

Introduction to safety, health and environmental management - Basic terms and their definitions - Importance of safety - Safety assurance and assessment - Safety in design and operation - Organizing for safety.

Unit – II

Hazard classification and assessment - Hazard evaluation and hazard control.
 Environmental issues and Management - Atmospheric pollution - Flaring and fugitive release
 - Water pollution - Environmental monitoring - Environmental management.

Unit – III

Accidents modelling - Release modelling - Fire and explosion modelling - Toxic release and dispersion Modelling

Unit – IV

accident investigation and reporting - concepts of HAZOP and PHA.
 Safety measures in design and process operations - Inserting, explosion, fire prevention, sprinkler systems.

Unit – V

Risk assessment and management - Risk picture - Definition and characteristics - Risk acceptance criteria - Quantified risk assessment - Hazard assessment - Fatality risk assessment - Risk management principles and methods.

Reference Books

1. Skelton. B, Process Safety Analysis, Gulf Publishing Company, Houston, 210pp., 1997.
2. Terje Aven and Jan Erik Vinnem, Risk Management with Applications from Offshore Petroleum Industry, Springer, 200pp., 2007.
3. Jorg Schneider, Introduction to Safety and Reliability of Structures, Structural Engineering Documents Vol. 5, International Association for Bridge and Structural Engineering (IABSE), 138pp., 1997.

4. Roger L. Brauer, Safety and Health for Engineers, John Wiley and Sons Inc. pp. 645-663, 2006.
5. Srinivasan Chandrasekaran, Health, Safety and Environmental Management in Offshore and Petroleum Engineering, John Wiley and Sons, 2016.

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B.Tech (R-19 Civil Engineering)
Honors Degree Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|----------------------|---|---|---|---|
| | SOIL DYNAMICS | 2 | 1 | 0 | 3 |

COURSE OBJECTIVE :

The objectives of this course are:

| | |
|---|---|
| 1 | To make the student understand the fundamental definitions of vibrations like simple harmonic motion etc and vibration measurements. |
| 2 | To make the student understand about the wave propagation and dynamic soil properties and laboratory testing, field testing techniques. |
| 3 | To make the student analyze the vibrations using various methods and also effects footing shapes on vibratory response |
| 4 | To make the student analyze and design of foundations for reciprocating engines and impact type machines |
| 5 | To make the student analyze and design of piles under various types of vibration conditions such as vertical vibrations etc. |

COURSE OUTCOMES :

On completion of the course, the students will be able to

| | |
|---|---|
| 1 | Understand the fundamental definitions of vibrations like simple harmonic motion, frequency dependent excitation etc. |
| 2 | Understand about the wave propagation and dynamic soil properties and laboratory and field testing techniques. |
| 3 | Analyze the vibrations using various methods and also effects footing shapes on vibratory response |
| 4 | Design of the foundations for reciprocating engines and impact type machines |
| 5 | Design of piles under various types of vibration conditions such as vertical vibrations , piles subjected to torsion etc. |

UNIT:I

Fundamentals of Vibration: Definitions, Simple harmonic motion, Response of SDOF systems of Free and Forced vibrations with and without viscous damping, Frequency dependent excitation, Systems under transient loads, Rayleigh's method of fundamental frequency, Logarithmic decrement, Determination of viscous damping, Transmissibility, Systems with Two and Multiple degrees of freedom, Vibration measuring instruments.

UNIT:II

Wave Propagation and Dynamic Soil Properties: Propagation of seismic waves in soil deposits - Attenuation of stress waves, Stress-strain behaviour of cyclically loaded soils, Strength of cyclically loaded soils, Dynamic soil properties - Laboratory and field testing techniques, Elastic constants of soils, Correlations for shear modulus and damping ratio in sand, gravels, clays and lightly cemented sand. Liquefaction of soils: An introduction and evaluation using simple methods.

UNIT:III

Vibration Analyses: Types, General Requirements, Permissible amplitude, Allowable soil

pressure, Modes of vibration of a rigid foundation block, Methods of analysis, Lumped Mass models, elastic half space method, elasto-dynamics, effect of footing shape on vibratory response, dynamic response of embedded block foundation, Vibration isolation.

UNIT:IV

Design of Machine Foundations: Analysis and design of block foundations for reciprocating engines, Dynamic analysis and design procedure for a hammer foundation, IS code of practice design procedure for foundations of reciprocating and impact type machines. Vibration isolation and absorption techniques.

UNIT:V

Machine Foundations on Piles: Introduction, Analysis of piles under vertical vibrations, Analysis of piles under translation and rocking, Analysis of piles under torsion, Design procedure for a pile supported machine foundation

REFERENCES:

1. I.Chowdhary and S P Dasgupta - Dynamics of Structures and Foundation, 2009.
2. Arya, S. D, O'Neil, M. and Pincus, G.- Design of Structures and Foundations for Vibrating Machines, Gulf Publishing Co., 1979.
3. Prakash, S. and Puri, V. K. - Foundation for Machines: Analysis and Design, John Wiley & Sons, 1998.
4. Prakash, S. - Soil Dynamics, McGraw Hill, 1981.
5. Kameswara Rao, N. S. V. - Vibration Analysis and Foundation Dynamics, Wheeler Publication Ltd., 1998.
6. Richart, F. E. Hall J. R and Woods R. D. - Vibrations of Soils and Foundations, Prentice Hall Inc., 1970.
7. Swami Saran - Soil Dynamics and Machine Foundation, Galgotia Publishing, 1999.
8. Das, B. M. - Principles of Soil Dynamics, PWS KENT publishing Company, Boston.
9. Kramer S. L. - Geotechnical Earthquake Engineering, Prentice Hall, 1996.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (Autonomous), ANANTHAPURAMU
B.Tech (R-19 Civil Engineering)

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-----------------------------------|---|---|---|---|
| | ADVANCED STRUCTURAL DESIGN | 2 | 1 | 0 | 3 |

Honors Degree Syllabus

COURSE OBJECTIVES:

| | |
|---|---|
| 1 | To teach concepts of concrete beams and slabs by following different codes by BS 8110 - Euro code – ACI - IS 456 |
| 2 | To Understand Estimation Of Crack width In -Beams , Shrinkage And Thermal Cracking By IS 456 Of BS 8110 |
| 3 | To impart design procedure of Shear In Flat Slabs And Flat Plates |
| 4 | To impart design Of Plain Concrete Walls And Shear Walls |
| 5 | To demonstrate design of Design Of Reinforced Concrete Members For Fire Resistance by ISO 834 Standard Heating Conditions |

COURSE OUTCOMES

On completion of the course, the students will be able to

| | |
|---|--|
| 1 | Understand the basic concepts of concrete beams and slabs by different codes |
| 2 | To know the concepts of deep beams by British practice-ACI –IS 456 |
| 3 | Apply design concepts to Shear In Flat Slabs And Flat Plates |
| 4 | Apply design concepts to Plain Concrete Walls And Shear Walls |
| 5 | Understand the basic concepts of fire resistance |

UNIT : I

Deflection Of Reinforced Concrete Beams And Slabs: Introduction -Short-Term Deflection Of Beams And Slabs -Deflection Due To - Imposed Loads - Short- Term Deflection Of Beams Due To Applied Loads- Calculation Of Deflection By IS 456 - Calculation Of Deflection By BS 8110 - Deflection Calculation By Euro code – ACI Simplified Method - Deflection Of Continuous Beams By IS 456 - Deflection Of Cantilevers - Deflection Of Slabs

UNIT: II

Estimation Of Crack Width In Reinforced Concrete Members And Design Of Deep Beams: Introduction - Factors Affecting Crack width In Beams - Mechanism Of Flexural Cracking Calculation Of Crack Widths - Simple Empirical Method - Estimation Of Crack width In -Beams By IS 456 Of BS 8110 - Shrinkage And Thermal Cracking. Deep Beams: Introduction - Minimum Thickness - Steps Of Designing Deep Beams - Design By IS 456 - Design According To British Practice - ACI Procedure For Design Of Deep Beams - Checking For Local Failures - Detailing Of Deep Beams.

UNIT: III

Shear In Flat Slabs And Flat Plates: Introduction - Checking For One-Way (Wide Beam) Shear - Two-Way (Punching) Shear Permissible Punching Shear - Shear Due To Unbalanced Moment (Torsional Moments) Calculation Of J Values - Strengthening Of Column Areas For Moment Transfer By Torsion Which Produces Shear - Shear Reinforcement Design - Effect Of Openings In Flat Slabs - Recent Revisions In ACI 318 -

Shear In Two – Way Slabs With Beams.

UNIT: IV

Design Of Plain Concrete Walls And Shear Walls: Introduction - Braced And Unbraced Walls - Slenderness Of Walls- Eccentricities Of Vertical Loads At Right Angles To Wall - Empirical Design Method For Plane Concrete Walls Carrying Axial Load - Design Of Walls For In-Plane Horizontal Forces - Rules For Detailing Of Steel In Concrete Walls Design Of Shear Walls: Introduction - Classification Of Shear Walls - Classification According To Behavior - Loads In Shear Walls - Design Of Rectangular And Flanged Shear Walls - Derivation Of Formula For Moment Of Resistance Of Rectangular Shear Walls 28

UNIT: V

Design Of Reinforced Concrete Members For Fire Resistance : Introduction - ISO 834 Standard Heating Conditions- Grading Or Classification - Effect Of High Temperature On Steel And Concrete - Effect Of High Temperatures On Different Types Of Structural Members - Fire Resistance By Structural Detailing From Tabulated Data - Analytical Determination Of The Ultimate Bending Moment Capacity Of Reinforced Concrete Beams Under Fire - Other Considerations

Text/Reference Books:

1. P.Purushothaman, Reinforced Concrete Structural Elements: Behaviour, Analysis And Design, Tata Mc graw Hill.
2. C.E. Reynolds And J.C. Steedman, Reinforced Concrete Designers Hand Book, A View Point Publication.
3. Limit State Design Of Reinforced Concrete Structures By P.Dayaratnam, Oxford &Ibh Publishers. 4. Advanced Rcc By N.Krishna Raju, Cbs Publishers & Distributors. 5. Reinforced Cement Concrete Structures – Devdas Menon &Unnikrishna Pillai,

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B.Tech (R-19 Civil Engineering)

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|------------------------------------|---|---|---|---|
| | Construction Economics and Finance | 2 | 1 | 0 | 3 |

Honors Degree Syllabus

COURSE OBJECTIVES

The objectives of this course are:

| | |
|----|---|
| 1. | the market structures and integration concepts |
| 2. | To study the role & methods of economics & finance concepts applied to construction business. |
| 3. | Acquire knowledge of economics to facilitate the process of economic decision making |
| 4. | Acquire knowledge on basic financial management aspects |
| 5. | Develop the skills to analyze financial statements |

COURSE OUTCOMES

On completion of the course, the students will be able to

| | |
|----|---|
| 1. | Evaluate the economic theories, cost concepts and pricing policies |
| 2. | Apply Systematic evaluation of cost and benefit associated with different projects. |
| 3. | Apply the concepts of financial management for project appraisal |
| 4. | Understand accounting systems and analyze financial statements |
| 5. | Understand the impact of economic investment and project-management Techniques |

UNIT - I

Economics- Role of Civil Engineering in Industrial Development-Advances in Civil Engineering and engineering economics- Support matters of Economy as related top Engineering-Market demand and supply-Choice of technology- Quality control and Quality Production-Audit in economic law of returns governing production

UNIT - II

Construction of economics- Construction development in housing, Transport and other infrastructures-Economics of Ecology, environment, energy resources-Local material selection - Form and Functional designs-Construction workers- Urban problems - Poverty-Migration-Unemployment-pollution.

UNIT - III

Basics of accounting -cash basis of accounting- accrual basis of accounting. Final accounts-trading, profit and loss account-balance sheet. Analysis of financial statement - ratio analysis-Dupont chart - trend analysis-common size statement- cash flow analysis. Completed contract method -percentage completion method.

UNIT - IV

Long term sources of financing-Equity -debenture- long term loan - preference share -- venture capital - leasing. Short term sources of fund -- money market instruments - certificate of deposit - cash credit - repurchase agreement - treasury bill - commercial paper .

UNIT – V

Important decision of finance - investment decision -capital budget technique - procurement decision - dividend policy decision. Cost of capital.

TEXT BOOKS:

1. Prasanna Chandra, -Projects - Planning Analysis Selection Implementation & Review ", Tata

McGrawHill Publishing Co., Ltd, New Delhi.

2. Kwaku A., Tenah and Jose M

. Guevera, -Fundamental of Construction Management and Organization ", Prentice Hall of India

References:

1. Halpin, D.W., " Financial and cost concepts for construction Management ", John Wiley &

Sons, New York,

2. Madura J. and Veit, E.T., -Introduction to Financial Management ", WestPublishing Co.

3. Stephen L. Gruneberg Construction Economics: An Introduction (Building & Surveying Series), Palgrave Macmillan.

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| Subject Code | Title of the Subject | L | T | P | C |
|--------------|-------------------------|---|---|---|---|
| | Traffic Analysis | 2 | 1 | 0 | 3 |

Honors Degree Syllabus

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|----|---|
| 1. | To make the student understand the application of Statistical Distributions for Traffic Analysis |
| 2. | To introduce the concepts of Queuing Theory and the application of the same for delay analysis |
| 3. | To make the student understand the concept of shock waves in Traffic and the application of the Shock wave Theory to compute delays and speed reduction |
| 4. | To introduce to the students the concept and basic principles of Simulation Modelling and how Simulation Modelling can be used in Traffic Analysis |
| 5. | To give basics of Simulation Modelling and how it can be applied to simulate any Traffic system for analysis of various parameters through case studies |

COURSE OUTCOMES:

On completion of the course, the students will be able to

| | |
|----|---|
| 1. | Student will understand the different types of Statistical Distributions available and how they can be effectively used in Traffic Analysis |
| 2. | Student will understand the basic concepts of Queueing Theory and how M/M/1 system can be applied for Toll Plazas and Parking Garages to analyse the Delays, queue characteristics and efficiency of the system |
| 3. | Student will understand the basic concepts of Queueing Theory application for D/D/1 system that can be applied for Traffic Signals and Bottlenecks to analyse the Delays and queue characteristics |
| 4. | Student will comprehend the Shock Wave Theory and how it can be applied to delays caused due to unforeseen roadblocks and Bottlenecks |
| 5. | Student will understand basics of Simulation Modelling and how it can be applied to simulate any Traffic system for analysis of various parameters through case studies |

UNIT-I:

Traffic Flow Description: Types of Statistical Distributions; Discrete and Continuous Distributions; Counting And Interval Distributions Used In Traffic Analysis; Poisson's Distribution For Vehicle Arrivals; Headway Distributions – Exponential Distribution; Shifted Exponential Distribution; Erlang Distribution; Composite Distribution. Numerical Exercises.

UNIT-II:

Queueing Theory: M/M/1 System:

Introduction To Queueing Theory; Notation Used for Describing A Queue System; Analysis of M/M/1 System; Assumptions And Derivation Of System State Equations; Application Of M/M/1 Analysis For Parking Garages And Toll Plazas- Numerical Examples.

UNIT-III:

Queueing Theory: D/D/1 System:

D/D/1 System: Analysis Of D/D/1 System for Delay Characteristics; Traffic Signal Analysis

As D/D/1 System; Computation of Delays and Queue Dissipation Time – Numerical Examples.

UNIT-IV:

Shockwave Theory:

Concept of Shockwave; Traffic Interruptions Like Accidents or Bottlenecks; Flow-Density Diagram Use in Shockwave Analysis; Use Of Time-Space Diagram For Shockwave Description; Bottleneck Situations And Shockwaves.

UNIT-V:

Traffic Simulation:

Introduction To Simulation; Need for Simulation Modelling; Steps In Simulation; Interval Oriented And Event Oriented Simulation; Use Of Random Numbers In Simulation; Random Number Generation Methods; Computing Headways And Arrival Times Based On Random Numbers; Basic Concepts of Simulation Modelling Application For Signalised Intersections, Pedestrian Crossings And Transit Scheduling.

TEXT BOOKS:

1. Fundamentals Of Transportation Engineering – C.S.Papacostas, Prentice Hall India Publication
2. Principles Of Highway Engineering And Traffic Analysis – F.L.Mannering&W.P.Kilareski, John Wiley Publishers.
3. Traffic Engineering and Transportation Planning -L.R.Kadiyali, Khanna Publications.

REFERENCES:

1. Traffic Flow Theory: A Monograph, TRB Special Report 165
2. Fundamentals Of Transportation Engineering – C.S.Papacostas, Prentice Hall India Publication
3. Principles Of Highway Engineering And Traffic Analysis – F.L.Mannering&W.P.Kilareski, John Wiley Publishers.
4. Traffic Flow Fundamentals – A.D.May, , Prentice Hall India Publication

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Honors Degree Syllabus

| Subject Code | Title of the Subject | L | T | P | C |
|--------------|---|---|---|---|---|
| | SUSTAINABLE RIVER BASIN MANAGEMENT | 2 | 1 | 0 | 3 |

COURSE OBJECTIVES:

The objectives of this course are:

| | |
|---|---|
| 1 | To make the student understand the Concepts of sustainability |
| 2 | To introduce the concepts of River Basin management |
| 3 | To make the student understand the concept of rainfall Economic and financial |
| 4 | To educate and technology transfer Water conservation and efficiency Improving monitoring and data management |
| 5 | To Evaluate sustainability in river basin management, Sustainability criteria |

COURSE OUTCOMES

On completion of the course, the students will be able to

| | |
|---|--|
| 1 | student understand the Concepts of sustainability |
| 2 | student understand the concepts of River Basin management |
| 3 | student understand the concept of rainfall Economic and financial |
| 4 | student understand transfer Water conservation and efficiency Improving monitoring and data management |
| 5 | student understand sustainability in river basin management, Sustainability criteria |

UNIT: I

Concepts of sustainability: Sustainability indicators, resources depletion, growth models Planetary System Boundaries, footprints, prosperity Globalization, inter-connected world Stakeholders in sustainability

UNIT: II

Natural water resources Anthropogenic Climate change, climate variability Hydrological cycle, water balance, catchment terminology, River basin management Water availability, surplus, deficit Water scarcity, water crisis Stream morphology and land use Engineering Pre-requisites: Working knowledge of: the water cycle, water budget, hydrological parameters and instrumentation.

UNIT: III

Status and challenges regarding sustainability and river basin management Water and society, poverty, demography Water governance, integrity, accountability Pollution, water related diseases, source water protection Water and land use, wetlands, desertification Dams, diversions, artificial rainfall Economic and financial instruments in water management Hydrological change due to climate change

UNIT: IV

Towards sustainability in river basin management - a holistic and interdisciplinary approach Protecting water resources / improving water quality Living standards, equity, education and technology transfer Water conservation and efficiency Improving monitoring and data management, decision support systems Improving management and justice Improving

administrative (transnational) structures Improving prediction and risk assessment

UNIT: V

Evaluate sustainability in river basin management, Sustainability criteria (ecological, economic institutional, social) Multi-criteria decision support

TEXT BOOKS :

1. Anthony, J.A., Abdulrahman, S.A., et al. 2003. Integrated water resources management is more a political than a technical challenge. In *Developments in water science*. ed., 9-23. Elsevier, Amsterdam, The Netherlands.[Google Scholar](#)
2. Aspinall, R. and Pearson, D. 2000. Integrated geographical assessment of environmental condition in water catchments: Linking landscape ecology, environmental modelling and GIS. *Journal of Environmental Management* 59(4): 299-319.