Department of Civil Engineering  
B.Tech (Civil Engineering)  
**COURSE STRUCTURE**  
(Applicable for the batches admitted from 2013-14)  
Non FSI Model

### B.Tech. 5th Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Name of the Subject</th>
<th>Lecture</th>
<th>Tutorial</th>
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*List of the available & selected courses intimated before commencement of semester.*
### B.Tech. 6th Semester

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**Elective-II**

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**Total** 15 5 6 26

*List of the available & selected courses intimated before commencement of semester.*
### B.Tech. 7th Semester

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**Total** 9 3 6 16

*List of the available & selected courses intimated before commencement of semester.*

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#### Elective-VI

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<td>CE 4448</td>
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**Total** 8 2 9 24

*List of the available & selected courses intimated before commencement of semester.*
Department of Civil Engineering  
**COURSE STRUCTURE (AR-13)**  
(Applicable for the batches admitted from 2013-14)  
**FSI Model – For students going to FSI in 7th Semester**

**B.Tech. 5th Semester**

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<th>Code</th>
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<th>Lecture</th>
<th>Tutorial</th>
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<td>Transportation Engineering</td>
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**Elective-I**

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<td>Transportation Engineering Lab</td>
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<td>Term paper/Mini project</td>
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**Total**  
15  
5  
9  
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*List of the available & selected courses intimated before commencement of semester.*
### B.Tech. 6th Semester

<table>
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<tr>
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#### Elective-II

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**Total** 15 5 6 26

*List of the available & selected courses intimated before commencement of semester.
### B.Tech. 7th Semester

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#### Elective-IV & Elective-V

Students shall opt two courses from the below list

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<td>CE 4241</td>
<td>Environmental Engineering Lab</td>
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<tr>
<td>CE 4242</td>
<td>Structural Modeling and Design Lab</td>
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</table>

Total 10/11 2/3 9/12 20

*List of the available & selected courses intimated before commencement of semester.
Department of Civil Engineering

**COURSE STRUCTURE (AR-13)**

(Applicable for the batches admitted from 2013-14)

FSI Model – For students going to FSI in 8th Semester

### B.Tech. 5th Semester

<table>
<thead>
<tr>
<th>Code</th>
<th>Name of the Subject</th>
<th>Lecture</th>
<th>Tutorial</th>
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<tr>
<td>CE 3414</td>
<td>Elements of Reinforced Concrete Design</td>
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<td>CE 3415</td>
<td>Hydrology and Irrigation Engineering</td>
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<td>CE 3416</td>
<td>Methods of Structural Analysis</td>
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<tr>
<td>CE 3417</td>
<td>Transportation Engineering</td>
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**Elective-I**

<table>
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<th>Code</th>
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<th>Lecture</th>
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<tbody>
<tr>
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<td>1. Building Technology</td>
<td>3</td>
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<tr>
<td>CE 3419</td>
<td>2. Finite Element methods in Civil Engineering.</td>
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<tr>
<td>CE 3420</td>
<td>3. Geomatics</td>
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<tr>
<td>CE 3221</td>
<td>Building Planning and AutoCAD Lab</td>
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<td>CE 3222</td>
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<td>GMR 30206/</td>
<td>Term paper/Mini project</td>
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**Total** | 15 | 5 | 9 | 26

*List of the available & selected courses intimated before commencement of semester.*
### B.Tech. 6th Semester

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<tr>
<td>CE 3423</td>
<td>Environmental Engineering</td>
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<tr>
<td>CE 3424</td>
<td>Fundamentals of Soil Mechanics</td>
<td>3</td>
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<td>Hydraulic Structures</td>
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**Elective-II**

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<tr>
<td>CE 3426</td>
<td>1. Air and Noise pollution</td>
<td>3</td>
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<tr>
<td>CE 3427</td>
<td>2. Pavement Analysis and Design</td>
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<td>CE 3428</td>
<td>3. Solid Waste and Environmental Management</td>
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**Elective-III (Open elective)**

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<td>Disaster Management (Civil)</td>
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<td>Industrial Safety and Hazards Management (CHE)</td>
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<td>Principles of Entrepreneurship (ME)</td>
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<td>EEE 3427</td>
<td>Renewable Energy (EEE);</td>
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**Total** 15 5 6 26

*List of the available & selected courses intimated before commencement of semester.*
## B.Tech. 7th Semester

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**Elective-IV**

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<td>CE 4434</td>
<td>2. Earthquake Resistant Design</td>
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<tr>
<td>CE 4435</td>
<td>3. Ground water Hydrology</td>
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<td>CE 4436</td>
<td>4. Retrofitting and Rehabilitation of Structures</td>
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**Elective-V**

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**Total**

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*List of the available & selected courses intimated before commencement of semester.

## B.Tech. 8th Semester

<table>
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<tr>
<th>Code</th>
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<td>GMR 42007</td>
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Department of Civil Engineering  
B.Tech- 5th Semester  

SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: ELEMENTS OF REINFORCED CONCRETE DESIGN  
Course Code: CE3414  
L: T: P: C:: 3:1:0:4

OBJECTIVES:
This course enables the student  
i) To learn design principles of Working stress and Limit state Designs as per IS: 456-2000  
ii) To know the design parameters of singly reinforced, doubly reinforced, flanged beam elements for flexure as well as their load carrying capacities.  
iii) To design beam element subjected to shear, torsion and bond.  
iv) To know the design parameters of short and long columns subjected axial load, axial load and moments using SP: 16 charts  
v) To know the design parameters of slabs and footings.  
vi) To check for Limit state of serviceability

OUTCOMES:
At the end of the course student will be able to  
At the end of the course student will be able to  
1. Design a singly reinforced concrete beam of rectangular cross section by using Working Stress Design philosophy.  
3. Design long and short rectangular and circular columns subjected to axial load, uniaxial and biaxial moments as per IS: 456-2000  
4. Design the isolated rectangular and combined footing subjected to axial load, axial load and moment as per IS: 456-2000  
5. Design one way and two way slabs as per IS: 456-2000  
6. Compute the deflections under serviceability criteria as per IS: 456-2000
UNIT –I:                              (8+2)
theory, design constants; singly reinforced beam.
INTRODUCTION OF LIMIT STATE DESIGN: Concepts of limit state design – Basic statistical
principles – Characteristic loads –Characteristic strength – Partial load and safety factors – representative
stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design –
stress - block parameters – limiting moment of Resistance

UNIT –II:                                               (12+5)
BEAMS: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.
SHEAR, TORSION AND BOND: Limit state analysis and design of section for shear and torsion –
concept of bond, anchorage and development length, I.S. code provisions.

UNIT – III:                                       (13+ 5)
COLUMNS: Short and Long columns – under axial loads, uniaxial bending and biaxial bending – Braced
and un-braced columns – I S Code provisions.
FOOTINGS: Different types of footings – Design of isolated, square, rectangular and circular footings.

UNIT – IV:                                      (12+3)
SLABS: Design of Two-way slabs, one way slab
DEFLECTION: Limit state design for serviceability for deflection, cracking and codal provision.

NOTE: All the designs to taught in Limit State Method. Following plates should be prepared by the
students.
1. Reinforcement particulars of simply supported, cantilever-beams.
2. Reinforcement detailing of T and L-beams
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, two way slabs

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

Text books:
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers,
New Delhi
Ltd., New Delhi

References :
1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New
Delhi.
2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata
3. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi,
publishations Pvt.Ltd., New Delhi
Department of Civil Engineering  
B.Tech- 5th Semester  
SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)  

Course Title: HYDROLOGY AND IRRIGATION ENGINEERING  
Course Code: CE3415  
L: T: P: C:: 3:1:0:4  

OBJECTIVES:  
The course content enables students to:  
i). Understand Hydrology and hydrologic cycle, Classification of Precipitation, estimation of missing rain fall data,  
ii). Learn about unit hydrograph, estimation of hydrograph of different storm durations by using unit hydrograph and Synthetic hydrograph.  
iii).Learn about the Geological formation of the aquifers radial flow to wells in confined and unconfined aquifers.  
iv). Understand the Necessity and Impotence of irrigation, types of Irrigation, methods of application of irrigation water, duty and delta, Soil-water-plant relationship.  
v). Know about Classification of canals and design irrigation canals by Kennedys and Laceys methods and also discussed about flood routing.  

OUTCOMES:  
At the end of the course students will be able to  
a. Identify components of hydraulic structures  
b. Estimate direct run off from total rain fall, ground water recharges potential, base flow and flood discharge in the catchment area.  
c. Construct Hydrograph at a particular location on the stream.  
d. Calculate the inflow quantity in to the confined and unconfined wells and seepage characteristics of the ground.  
e. Calculate duty and delta, depth and frequency of irrigation to improve the irrigation efficiency and design of irrigation canals suitable for different type of soils.
UNIT – I:
INTRODUCTION: Engineering hydrology and its applications, Hydrologic cycle.
PRECIPITATION: Types and forms of precipitation, rainfall measurement, types of rain gauges, rain
gauge network, average rainfall over a basin, consistency of rainfall data, frequency of rainfall, intensity-
duration-frequency curves, probable maximum precipitation

ABSTRACTIONS:
EVAPORATION- factors affecting evaporation, measurement of evaporation, evaporation reduction,
EVAPOTRANSPIRATION- factors affecting evapotranspiration, measurement of evapotranspiration
INFILTRATION- factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT – II:
RUNOFF: Factors affecting runoff, components of runoff, computation of runoff-rational and SCS
methods, separation of base flow.
UNIT HYDROGRAPH : Definition of Unit Hydrograph, assumptions, derivation of Unit Hydrograph,
unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations
and applications of UH, Synthetic Unit Hydrograph,

FLOODS AND FLOOD ROUTING: Stream gauging, direct and indirect methods, floods-causes and
effects, flood frequency analysis-Gumbel’s method, log Pearson type III method, flood control methods
FLOOD ROUTING-hydrologic routing, channel and reservoir routing-Muskingum and Pulse method of
routing.

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

IRRIGATION
Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods
of application of Irrigation water, water logging and drainage, standards of quality for Irrigation water,
principal crops and crop seasons, crop rotation.

UNIT – IV:
SOIL-WATER-PLANT RELATIONSHIP: vertical distribution of soil moisture, soil moisture tension,
consumptiveuse, estimation of consumptive use,
DUTY AND DELTA- factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.
CANALS: Classification of canals, design of canals by Kennedy’s and Lacey’s theories, balancing depth
of cutting, canal lining, design of lined canal, economics of canal lining.

Text Books:
1. Engineering Hydrology by K. Subramanya, TATA McGraw-HILL Education Private
   Limited.
3. Irrigation and water power engineering by B.C. Punmia&Lal, Laxmi publications pvt.Ltd.,New
   Delhi

References:
   Irrigation and Hydraulic structures by SK Garg, Khanna Publishers.
Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: METHODS OF STRUCTURAL ANALYSIS

Course Code: CE3416
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i) Become proficient in applying the classical methods of analysis with speed and accuracy
ii) Understand the concept used in the structural analysis software.
iii) Use updated structural analysis software in solving indeterminate structures
iv) Submit accurate analysis in an efficient and professional way
v) Preparing student to Identify the relevant method for the analysis

OUTCOMES:

At the end of the course student will be able to

a) Analyze three /two hinged arches and obtain internal forces at any cross section.
b) Determine design forces in arches subjected to concentrated, distributed and varying loads.
c) Determine the forces in indeterminate frames subjected to lateral loads by using approximate methods of analysis.
d) Solve statically indeterminate beams and frames using classical methods.
e) Evaluate the suitability of classical methods for a given structure and loading.
f) Utilize modern structural analysis software
UNIT – I:  

THREE HINGED ARCHES:  
TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses. (6)

UNIT – II:  

APPROXIMATE METHOD OF STRUCTURAL ANALYSIS: Application to building frames. (i) Portal method (ii) Cantilever method. (5)  
SLOPE DEFLECTION METHOD: Derivation of slope deflection equation of supports application to continuous beams including settlement of supports. (5)

UNIT – III:  

MOMENT DISTRIBUTION METHOD – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames – including Sway. (7)  
KANI’S METHOD – including settlement of supports and single bay portal frames with side sway by Kani’s method. (6)

UNIT – IV:  

FLEXIBILITY METHOD: Introduction, application to continuous beams including support settlements (maximum of two unknowns) (5)  
STIFFNESS METHOD: Introduction, application to continuous beams including support settlements. (maximum of two unknowns) (5)

Text Books:
2. Analysis of Structures by Bhavikatti, Vikas publications  

References: 
2. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi  
3. Theory of structures by Ramamuratam
Department of Civil Engineering  
B.Tech- 5th Semester  

SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: TRANSPORTATION ENGINEERING

Course Code: CE3417  
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:
1. To learn highway alignment and design aspects of 
2. To Identify traffic problems and to regulate and manage the traffic. 
3. To Build knowledge on highway materials, construction and maintenance 
4. To Build knowledge on railway track components and design

OUTCOMES:

At the end of the course the Students will be able to:
1. Understand to fix ideal alignment and design of highway 
2. Identify traffic problems and give measures to regulate the traffic 
3. Build knowledge on highway materials quality, construction and maintenance 
4. Adapt railway engineering terminology, basics and build knowledge on track geometric design
UNIT – I:
HIGHWAY DEVELOPMENT AND ALIGNMENT
Highway development in India - Classification of Roads- Road Network Patterns –Highway Alignment- Factors affecting Alignment- Engineering Surveys

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- Vertical curves.

UNIT – II
TRAFFIC ENGINEERING AND MANAGEMENT:
Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies-Speed studies-Parking Studies - Road Accidents-Causes and Preventive measures- Traffic Signs and Road markings

INTERSECTION DESIGN:
Types of Intersections: At grade and grade separated – Need for channelization Islands- Design of Traffic Signals –Webster Method – Design of Rotary Intersection –Advantages and Disadvantages of Rotary Intersection

UNIT – III

HIGHWAY MAINTENANCE: Failure of Flexible and Rigid pavements and their maintenance.

UNIT – IV
INTRODUCTION TO RAILWAY ENGINEERING:
Permanent way components -Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast -Rail Fastenings -Creep of Rails- Adzing of Sleepers- Sleeper density. GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency -Degree of Curve - Crossings and Turn outs.

Text Books:
3. Traffic engineering- L.R.Kadiyali, Khanna publishers

References:
Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: BUILDING TECHNOLOGY (Elective-I)  
Course Code: CE3418  
L: T: P: C:: 3:1:0:4

OBJECTIVES:
The course content enables students to:

i) Get an idea about building drawing standards in various phases of a project.

ii) Know the detailing in building construction.

iii) Understand about planning of various buildings like residential, educational, office buildings and hospital buildings.

iv) To know about the project planning and management techniques.

OUTCOMES:
At the end of the course the learners will be able to

a) Know the various building bye-Laws laid by town planning authorities and local regulatory bodies for planning various buildings like residential, educational, office buildings and hospital buildings.

b) Know about the techniques for project planning and management.

c) Understand the building drawing standards in various phases of a project.

d) Understand the detailing in building construction.
UNIT – I:


UNIT – II:

PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart, CPM and PERT Network planning. Computation of times and floats – their significance.

UNIT – III


UNIT – IV:

PUBLIC BUILDINGS: Planning of Educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

Text Books:
2. PERT and CPM – Project planning and control with by Dr. B.C. Punmia & Khandelwal – Laxmi publications.
3. ‘A’ Series & ‘B’ Series of JNTU Engineering College, Anantapur,

References:
1. Building by laws by state and Central Governments and Municipal corporations
Department of Civil Engineering  
B.Tech- 5th Semester  
SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: FINITE ELEMENT METHODS IN CIVIL ENGINEERING (Elective-I)  
Course Code: CE3419  
L: T: P: C:: 3:1:0:4

OBJECTIVES:
The course content enables students to:

i) To Understand the fundamental ideas of the FEM  
ii) To Know the behavior and usage of each type of elements covered in this course  
iii) To prepare a suitable FE model for structural mechanical analysis problems  
iv) To interpret and evaluate the quality of the results (know the physics of the problems)  
v) To be acquaint with the limitations of the FEM being it to be a numerical tool.

OUTCOMES:
At the end of the course the learners will be able to

a) Idealize given structure with mathematical modeling and boundary conditions.  
b) Model the given structure with suitable elements.  
c) Conceptualize the Finite Element Analysis (FEA) procedure.  
d) Apply FEA procedure to 1-dimensional structures bars, trusses, plane stress and plane strain conditions using triangular and rectangular elements.  
e) Evaluating the suitability of type of element and methods of discretization.  
f) Set up and solve 1-D, 2-D, and 3-D structural problems using contemporary finite element software.  
g) Interpret results obtained from FEA software solutions, not only in terms of conclusions but also awareness of limitations.
UNIT –I


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 FEM : Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

UNIT –III

TWO DIMENSIONAL FEM : Different 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 –IV

Generation of element stiffness and nodal load matrices for 3-node triangular element and four node rectangular elements.


Text Book:

2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi

References:

Department of Civil Engineering  
B.Tech- 5th Semester  

SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: GEOMATICS (Elective-I)  
Course Code:CE3420  
L: T: P: C:: 3:1:0:4

OBJECTIVES:
The course content enables students to:

i) Introduce the high level understanding of Remote Sensing Techniques
ii) Explain the basic concept of GIS and different types of data representation in GIS
iii) Impart the knowledge of different data analysis techniques in GIS.
iv) Introduce the various spatial data models and data base models in GIS.
v) Discuss various applications of RS and GIS in Civil Engineering.

OUTCOMES:
At the end of the course, the student is able to:

a) Understand the basic concepts of spatial data acquisition procedures
b) Assess the quality of acquired spatial data in a quantitative way
c) Make informed and critical judgments on technical issues relating to the acquisition, storage, management, analysis and display of spatial data.
d) Understand the complexity of spatial data and their relationships with non-spatial information;
e) Appreciate and understand the spatial data and spatial analysis requirements of a remote sensing and/or GIS project;
f) Perform spatial analysis techniques on a varied range of applications in civil engineering

UNIT – I: 
(14+4)

INTRODUCTION TO 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 and spectral properties of vegetation, soil and water bodies,

REMOTE SENSING PLATFORMS & SENSORS: Introduction, Characteristics of imaging remote sensing instruments, satellite remote sensing system - a brief over view, other remote sensing satellites, Resolution in Remote Sensing, Elements of Visual Interpretation and Basics of DIP.

UNIT – II: 
(12+4)

DATA MANAGEMENT AND METADATA CONCEPT: Introduction, Concept of Database and DBMS, Advantages of DBMS, Functions of DBMS, File and Data Access, Data Models, Database Models, Data Models in GIS, Concept of Meta Data.

UNIT – III (9+4)
SPATIAL DATA MODEL: Introduction, Different dimensions of Geographic Data, Spatial Entity and Object, Spatial Data Model, Raster Data Model, Vector Data Model, Raster versus Vector, Object Oriented Data Model, File Formats of Spatial Data.

GEOSPATIAL ANALYSIS: Introduction, Geospatial Data Analysis, Integration and Modeling of Spatial Data, Geospatial Data Analysis Methods, database query, Geospatial measurements, Overlay Operations, Network Analysis, Surface Analysis.

UNIT – IV: (10+3)
GLOBAL POSITIONING SYSTEM: Introduction, elements of satellite surveying, the global positioning system, GPS satellites, adjustment computations, GPS observables.

APPLICATIONS: LULC, Agriculture, Forestry, Geology, Geomorphology, Urban Development, Flood Zone Delineation and Mapping, Ground Water Prospects and Recharge, GIS database design for physical facility planning, Decision support systems for land use planning, GIS based Highway alignment, GIS based road network planning and GIS based traffic congestion analysis, Accident investigation, Network Planning.

Text Books:
5. GPS Satellite Surveys, Alfred Leick, Willey & Sons.

References:
1. Introduction to Remote Sensing, James B. Cambell, Taylor & Francis
Course Title: BUILDING PLANNING AND AUTOCAD LAB
Course Code: CE3221
L: T: P: C:: 0:0:3:2

OBJECTIVES:
The course content enables students to:

i) Plot the layout of building for a given details
ii) Create multi-view drawings (orthographic projections).
iii) Draw section views.
iv) Create shapes and symbols for different uses.
v) Create and manage symbols libraries.

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

a) Create, display, and plot working drawings.
b) Use layering techniques.
c) Construct technical drawings using a standard computer aided drafting program.
d) Identify, operate and adjust input and output devices.
e) Demonstrate file management techniques.
LIST OF EXERCISES:

1. Using CAD software draw & print the following drawings.
   1.1 Draw conventional signs as per I.S. standards, symbols used in civil engineering drawing.
   1.2 Draw the important joinery components of the building like elevation of fully panelled double leaf door, elevation of partly glazed and partly panelled window.
   1.3 Prepare the king post & Queen post truss and label the various parts.

2 Residential buildings.
   2.1 Plan, Elevation, Section of single roomed building
   2.2 Single storied Two bed room residential building.

3 Structural detailing drawings
   3.1 Lintel cum Sunshade
   3.2 Continuous Beam.
   3.3 Isolated Column with square footing

4 Drawings to be submitted for approval to corporation or municipality showing required details in one sheet such as
   4.1 Plan – Showing Dimensions of all rooms.
   4.2 Section – showing Specifications and Typical Foundation Details.
   4.3 Elevation.
   4.4 Site Plan – Showing Boundaries of Site and Plinth Area
   4.5 Key plan – Showing the location of Building.
   4.6 Title Block – Showing signature of Owner & Licensed surveyor’s.
Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: TRANSPORTATION ENGINEERING LAB

Course Code: CE3222
L: T: P: C:: 0:0:3:2

OBJECTIVES:
The course content enables students to:
   i) Conduct tests and Evaluate the quality of aggregates used in the road construction
   ii) Conduct tests and Evaluate the quality of bitumen used in the road construction
   iii) Analyze and comprehend the data pertaining to traffic volume studies.

OUTCOMES:
At the end of course student will be able to
   a) Know the behavior of Road Aggregates
   b) Know the behavior of Bituminous materials
   c) Know the Traffic volume counts

LIST OF EXERCISES:

I. ROAD AGGREGATES:
1. Aggregate Crushing value
2. Aggregate Impact Test.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:
1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. TRAFFIC VOLUME STUDIES:
1. Traffic volume study at mid blocks and intersection.
2. Spot Speed Studies.
Department of Civil Engineering  
B.Tech- 6th Semester  

SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)  

Course Title: ENVIRONMENTAL ENGINEERING  
Course Code: CE3423  
L: T: P: C:: 3:1:0:4  

OBJECTIVES:  
The course content enables students to:  
   i) Develop overall technical competence in the students for understanding the concepts of the subject and enabling them to address the industry problems  
   ii) Update students knowledge in planning, design, construction, operation and maintenance aspects of water supply and sewerage systems.  
   iii) Reinforce management skills with regard to sustainable water supply and sewerage facilities.  
   iv) Provide theoretical background and practical expertise in the field of water supply and sewerage engineering.  

OUTCOMES:  
At the end of the course the learners will be able to  
   a. List the factors affecting water supply and wastewater generation  
   b. Understand the various types of water and wastewater characteristics  
   c. Design water and wastewater systems  
   d. Analyze available disposal options and their practical implications
UNIT – I: WATER SOURCES AND QUALITY (11+3)

UNIT – II: DESIGN OF WATER TREATMENT UNITS (12+5)

UNIT – III SEWAGE QUALITY AND DESIGN OF SEWAGE TREATMENT UNITS (13+5)

UNIT – IV: SLUDGE HANDLING AND DESIGN OF PONDS (9+2)
Concept of ponds-Construction and design of anaerobic and oxidation ponds - Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – Other options-septic tanks working principles and design – soak pits.

Text Books:
3. Elements of Environmental Engineering by K.N. Duggal, S. Chand Publishers

References:
2. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
3. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age India Publishing
Department of Civil Engineering  
B.Tech- 6th Semester  
SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)  

Course Title: FUNDAMENTALS OF SOIL MECHANICS  
Course Code: CE3424  
L: T: P: C:: 3:1:0:4  

OBJECTIVES:  

i). Creating awareness to student about soils and their engineering importance.  
ii). Helping students in aquatinting various procedures and tests for classifying soils and develop relationships among various properties.  
iii). Imparting knowledge for students about behavior of soils under various drainage Conditions.  
iv). Making students to perform computations for determination of strength parameters of soil with using various theories.  
v). Developing knowledge about conduct of different lab tests for determining engineering properties by simulating field conditions.  

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

a) Understand soil as a building material and load bearing member.  
b) Understand different procedures for classifying soils.  
c) Asses the influence of soil water relationship and analyze engineering behaviour of soils under different load/ drainage conditions  
d) Analyze the influence of field conditions on strength and consolidation properties of soils.
UNIT-I:

INTRODUCTION
Introduction to Soil Mechanics and Soil Engineering; Complexity of soil nature; Soil formation and soil types.

SOIL STRUCTURE: Basic concepts of clay minerals; Soil structure and fabric.

SIMPLE SOIL PROPERTIES AND CLASSIFICATION
Basic definitions; Phase relations; Index properties; Grain size distribution; Soil aggregate properties. Indian standard soil classification system.

UNIT-II:

PRINCIPLE OF EFFECTIVE STRESS AND RELATED PHENOMENA
Principle of effective stress; Capillarity; Seepage force and quicksand condition; Total, effective and neutral pressures.

PERMEABILITY:
One-dimensional flow; Darcy’s law; Laboratory methods for permeability determination; Field pumping tests for permeability determination; Permeability as a function of soil type, permanent, void ratio, soil fabric, and effective stress.

SEEPAE THROUGH SOILS:
Two-dimensional flow; Flow nets and their characteristics; Uplift pressure, exit gradient, and piping; Criteria for filters.

UNIT-III:

COMPACTATION AND STRESS DISTRIBUTION
Laboratory compaction tests; Factors affecting compaction; Structure and engineering behaviour of compacted cohesive soils; Field compaction; Compaction specifications and field control.

INTRODUCTION TO STRESS DISTRIBUTION: 2 to 1 method, Boussinesq’s theory for point, circular loads and Newmarks’ chart.

UNIT-IV:

CONSOLIDATION AND SHEAR STRENGTH
COMPRESSIBILITY AND CONSOLIDATION BEHAVIOUR
Components of total settlement; Effects of soil type, stress history, and effective stress on compressibility;Normally consolidated and over-consolidated soils; Terzaghi’s theory of onedimensional consolidation; Time-rate of consolidation; Evaluation of compressibility and consolidation parameters from consolidometer data.

SHEAR STRENGTH: Mohr’s stress circle; Mohr-Coulomb failure criterion; Laboratory tests for shear strength determination; Effective and total stress shear strength parameters; Shear strength characteristics of clays and sands.

Text Books:
1. A text book of Geotechnical Engineering by C.V.Ramaiah
2. Soil Mechanics and Foundation Engineering by B.C.Punmia

Reference Books:
1. Basics of applied soil mechanics - GopalRanjan, ASR Rao
2. Geotechnical engineering by S.K.Gulhati and ManojDatta
Department of Civil Engineering  
B.Tech- 6th Semester  

SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)  

Course Title: HYDRAULIC STRUCTURES  
Course Code: CE3425  
L: T: P: C:: 3:1:0:4  

OBJECTIVES:  
The course content enables students to  

i). Relate the head works constructed at the head of the canal and types and different components and their purposes.  
ii). Understand different theories behind the design of impervious floor in permeable soils.  
iii). Identify canal regulation structures and cross drainage structures come in the alignment of the channels.  
iv). Analyze for the forces to be considered in the in the stability Gravity dams  
v). Distinguish between earthen embankments and Causes of its failures and seepage theories  

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

a) Design the different water retaining structures.  
b) Analyze the parameters needed in the design of weirs/barrages in permeable soils.  
c) Analyze and design the Gravity dams and Earth dams with available foundation strata.  
d) Design the canal regulation structures and cross drainage structure  
e) Understand the design principles of canal fall and Spillway and able to design various components.
UNIT-I
DIVERSION HEAD WORKS: Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh’s creep theory, Khosla’s theory, determination of uplift pressure, impervious floors using Bligh’s and Khosla’s theory, exit gradient, functions of U/s and d/s sheet piles.
DAMS: Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-II
EARTH DAMS: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.
GRAVITY DAMS: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT-III
SPILLWAYS: types of spillways, design principles of Ogee spillways, types of spillway gates.
CANAL FALLS: types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.

UNIT-IV
CANAL REGULATION WORKS: Head regulator and cross regulator, design principles of Cross regulator and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.
CROSS DRAINAGE WORKS: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

Text Books:
1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation engineering by K.R.Arora

References:
1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Concrete dams by Varshney.
3. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: AIR AND NOISE POLLUTION CONTROL (Elective-II) Course Code: CE3426
L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). To study the fundamentals of air pollution and its global implication

ii). To study the various mechanisms involved in meteorological aspects of air pollution dispersion

iii). To understand the models available for predicting the air pollution dispersion

iv). To understand the principles of design of particulate control devices

v). To understand the principles of design of gaseous emission control devices

vi). To study the concepts of noise pollution and its control aspects

OUTCOMES:

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

a) learn the concepts of air pollution and its associated problems on a global scale

b) learn the influence of meteorological aspects on air pollution and its dispersion

c) design the different components of particulate and gaseous control equipment

d) understand problems of noise pollution

e) learn the basics of noise pollution and its control measures
UNIT – I: (10+3)
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 pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes – Carbon trading

UNIT – II: (12+4)
Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams-Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT – III: (12+4)
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: (11+4)
General Methods of Control of NOx and SOx emissions, Air Quality Management – Measurement and monitoring of SPM, SO; NO and CO Emissions- Standards-Air quality Index- Noise Pollution – effects of noise and control methods

Text Books:

References:
1) Sewage disposal and air pollution Engineering by S K Garg, Khanna Publishers
2) An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications
3) Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi
4) Air pollution and control by KVSG Muralikrishna
Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: PAVEMENT ANALYSIS AND DESIGN (Elective-II)    Course Code: CE3427
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i) To understand the various factors affecting in pavement design

ii) To build knowledge on design aspects and methods for flexible pavement design

iii) To build knowledge on design aspects and methods for rigid pavement design

iv) To build knowledge on types of pavement failures and maintenance solutions

OUTCOMES:

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

a) Build knowledge on the various factors affecting in pavement design

b) Design flexible pavement considering sub grade condition and axle loads

c) Design rigid pavement considering sub grade condition and axle loads

d) Discover pavement failures and their remedies
UNIT-I
ROAD FACTORS IN PAVEMENT DESIGN: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts
TRAFFIC FACTORS IN PAVEMENT DESIGN: ADT, AADT, Truck Factor, Growth Factor, Lane Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT- II
REQUIREMENTS AND FUNCTIONS OF FLEXIBLE PAVEMENT DESIGN: Objects and requirements of pavements-Types-Functions of pavement components

UNIT- III
RIGID PAVEMENTS DESIGN CONSIDERATIONS: Design considerations-wheel load stresses-Temperature stresses-frictional stresses-combination of stresses
DESIGN ELEMENTS AND METHODS OF FLEXIBLE PAVEMENT: Design of slabs-Design of joints-IRC method for low volume roads-Continuously Reinforced cement concrete pavements-Roller Compacted Concrete Pavements

UNIT-IV
PAVEMENT FAILURES:
Causes of pavement failures-failures in flexible pavements-alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation
REMEDIES FOR PAVEMENT FAILURES: alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation

Text Books:
1. Highway engineering by khanna & justo
2. Yoder and Witczak, Principles of Pavement Design, John Wiley and Sons
4. IRC:37 & 58 Codes for Flexible and Rigid Pavements Design.

References:
1. Rajib B. Mallick and Tahar El-Korchi, Pavement Engineering – Principles and Practice, CRC Press (Taylor and Francis Group)
4. Relevant IRC Codes
Department of Civil Engineering

B.Tech- 6th Semester
SYLLABUS
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: SOLID WASTE AND ENVIRONMENTAL MANAGEMENT (Elective-II)

Course Code:   CE3428
L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). Develop insight into the collection, transfer, and transport of municipal solid waste.
ii). Explain the design and operation of a municipal solid waste landfill.
iii). Examine the design and operation of a resource recovery facility.
iv). Summarize the design and operation of a waste-to-energy facility

OUTCOMES:
At the end of the course students are able to:

a) Understand the implications of the production, resource management and environmental impact of solid waste management;
b) Assimilate the significance of recycling, reuse and reclamation of solid wastes;
c) be familiar with relationships between inappropriate waste management practices and impacts on water, soil and sediment quality;
d) Appreciate the current practices available and implement the systems available in solid waste management;
e) be capable of carrying out an assessment of the relationships between environmental guidelines, human activities and environmental quality of impacted soils and water;
f) Integrate technical solid waste management options and imposed environmental legislation and guidance to develop legal and safe solutions.
UNIT-I
SOLID WASTE MANAGEMENT: – sources, composition and properties of solid waste – collection and handling – separation and processing
SOLID WASTE DISPOSAL METHODS: Land filling – Incineration composting

UNIT-II

UNIT-III
AUDIT AND LEGISLATIONS: 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 - Post Audit activities

UNIT – IV

Text Books:
1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA.

References:
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi
Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS

(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: DISASTER MANAGEMENT (Open Elective)  
Course Code: CE3429

L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response

ii). Understand and appreciate the specific contributions of the Red Cross/Red Crescent movement to the practice and conceptual understanding of disaster management and humanitarian response and their significance in the current context

iii). Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives

iv). Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations

v). Respond to disaster risk reduction initiatives and disasters in an effective, humane and sustainable manner.

OUTCOMES:

At the end of the course the learners will be able to:

a) Work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.

b) Manage the Public Health aspects of the disasters.

c) Obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

d) Design and perform research on the different aspects of the emergencies and disaster events while demonstrating insight into the potential and limitations of science, its role in society and people’s responsibility for how it is used.

e) Analyze and evaluate research work on the field of emergencies and disaster while demonstrating insight into the potential and limitations of science, its role in society and people’s responsibility for how it is used.

UNIT-1:

NATURAL HAZARDS AND DISASTER AND THEIR MANAGEMENT: Case study methods of the following: floods, droughts, - Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides
UNIT-II:


RISK AND VULNERABILITY: BUILDING codes and land use planning-social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, Climate change risk rendition-financial management of disaster – related losses.

UNIT – III


EDUCATION AND COMMUNITY PREPAREDNESS: Education in disaster risk reduction – Essentials of school disaster education – community capacity and disaster resilience – Community based disaster recovery - Community based disaster management and social capital – Designing resilience – building community capacity for action

UNIT-IV

MULTI – SECTIONAL ISSUES: Impact of disaster on poverty and deprivation - Climate change adaptation and human health – Exposure, health hazards and environmental capacity in disaster management - the red cross and red crescent movement - Corporate sector and disaster risk reduction A community focused approach

FIELD VISIT: visit to a loccal area / site where natural or manmade hazard has occurred and prepare a report with the following details i) location of site, ii) nature of the hazard (natural or manmade), iii) details of loss of life and property iv) response from the government / NGO etc. v) whether the response is adequate or not vi) the role of technology in risk reduction vii) suggestion for improvement of disaster response / preventive measures viii) Conclusions

Text Books:


Reference Book:

Department of Civil Engineering  
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SYLLABUS
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: GEOMATICS LAB  
Course Code: CE3230  
L: T: P: C: 0:0:3:2

OBJECTIVES

i). Megascopic identification of Rock forming, Ore forming minerals and rocks based on physical properties.
ii). Interpretation of geological maps showing tilted beds, faults, unconformities etc.
iii). Solving Structural Geology problems.
iv). To orient them towards usage of spatial technologies
v). To give exposure on the state of the art technologies in Geomatics

OUTCOMES
At the end of course student will be able to

a) Identify the various rocks and minerals based on the physical properties
b) Interpret different geological maps
c) Solve the various strike and dip problems
d) Work independently on various spatial technologies
e) Understand state of the art technologies in Geomatics

LIST OF EXERCISES:

ENGINEERING GEOLOGY

1. Physical properties of minerals: Megascopic identification of
   a) Rock forming minerals – Quartz group, Feldspar group, garnet group, mica group & talc, Chlorite, olivine, kyanite, asbestos, tourmelene, calcite, gypsum, etc…
   b) Ore forming minerals – magnetite, hematite, pyrite, pyralusite, graphite, chromite, etc…
   a) Igneous rocks – Types of granite, pegmatite, gabbro, dolerite, syenite, Granite porphyry, Basalt, etc…
   b) Sedimentary rocks – sand stone, ferrugineous sand stone, lime stone, shale, laterite, Conglomerate, etc…
   c) Metamorphic rocks – biotite – granite gneiss, slate, muscovite & biotite, schist, marble, khondalite etc…
3. Interpretation of geological maps

GIS

1. Georeferencing
2. Projection of Map
3. Digitization of Map/Toposheet
5. Study of features estimation
6. Generation of Digital Elevation model
7. Generation of LULC
8. Watershed Delineation
Department of Civil Engineering  
B.Tech- 6th Semester  
SYLLABUS  
(Applicable for the batches admitted from 2013-14 5th & 6th semester non-FSI & FSI model)

Course Title: SOIL MECHANICS LAB  
Course Code: CE3231  
L: T: P: C:: 0:0:3:2

OBJECTIVES:

i). To make the student learn, apply his ability of knowledge with hands of practice to determine index and engineering properties of soils.

ii). To have an exposure for determining various properties of soils in field and through simulating in lab.

OUTCOMES:

a) Identify tools, equipment required and familiarity with experimental procedures for determining index and engineering properties of soils

b) Perform field tests for soil investigations.

c) Apply field conditions for computing and analyzing the experimental data.

d) Infer the results and compare.

LIST OF EXERCISES:

1. Determination of Consistency Limits (Liquid, plastic and Shrinkage limit) for soil.

2. Determination of Field density with Core cutter method & Sand replacement method.

3. Determination of particle size distribution through mechanical and hydrometer analysis.


5. Determination of coefficient Permeability of soil with constant head and variable head Tests.

6. Determination of strength parameters of given soil with Unconfined Compression strength (UCS) test.

7. Determination of Consolidation characteristics of given cohesive soil by performing consolidation test.

8. Determination of Free swell index for soil.

9. Determination of Strength parameters of given soil under different drainage conditions with Triaxial Test.

10. Determination of strength parameter of given cohesion-less soil by performing Direct shear test.

11. Determination of C.B.R Value of given soil with Laboratory CBR Test. (Any eight shall be conducted.)
Department of Civil Engineering  
B.Tech- 7th Semester 
SYLLABUS  
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)  

Course Title: FOUNDATION ENGINEERING  
Course Code: CE4432  
L: T: P: C:: 3:1:0:4  

OBJECTIVES:  

Learner is expected to  

i). Conceptualize the necessity of site investigations for soil sampling.  
ii). Understand the essence of engineering properties in design of various structures constructed on and with soil.  
iii). Ascertain the stability of earthen structures.  
iv). Know the importance of foundation and different types with their design concepts.  

OUTCOMES:  

At the end of the course student will be able to  

a) Learn various types and methods of undisturbed and disturbed soil sampling.  
b) Perform computations for stability of earthen structures.  
c) Use the various properties of soils to design the shallow foundations for different loading conditions.  
d) Extend the theory of foundation design for special foundation types namely deep foundations.
UNIT – I  


UNIT – II  

EARTH PRESSURE THEORIES:  Rankine’s theory of earth pressure – earth pressures in layered soils – Coulomb’s earth pressure theory – Culmann’s graphical method.  

RETAINING WALLS:  Types of retaining walls – stability of retaining walls.  

UNIT – III  

SHALLOW FOUNDATIONS:  Types - choice of foundation – Location of depth – Safe Bearing Capacity – and IS Methods Safe bearing pressure based on N- value Allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures  

UNIT – IV  

PILE FOUNDATION:  Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups.  


Text Books:  


References:  

5. Teng,W.C – Foundation Design , Prentice Hall, New Jersey
Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)

Course Title: DESIGN OF REINFORCED CONCRETE STRUCTURES (Elective-IV)
Course Code: CE4433
L: T: P: C:: 3:1:0:4

OBJECTIVES:
The student is expected to
1. Design continuous beams and slabs as per IS456: 2000
2. Distinguish between RCC and PSC members
3. Understand principle in various methods of pre stressing systems
4. Evaluate the losses in pre and post tensioned members
5. Analyze and design members subjected to flexure and shear.

OUTCOMES:
At the end of the course student will be able to
1. Design the cross section and evaluate the amount of reinforcement required in the continuous beam as per IS: 456 codal recommendations for all practical loadings.
2. Design the amount of reinforcement required in the continuous slab and stair case as per IS: 456 codal recommendations for all practical loadings.
3. Perform analysis and design of prestressed concrete members and connections
4. Identify and interpret the appropriate relevant industry design codes.
5. Relate with professional and contemporary issues in the design and fabrication of prestressed concrete members.
6. Perform an industry relevant design project in a team setting.
UNIT – I: (9+4)

BEAMS: Design examples in simply supported and continuous beams, detailing.
SLABS: Design of continuous slab Using IS Coefficients, detailing, Design of stair case.

UNIT – II: (11+4)

INTRODUCTION: Historic development – General principles of prestressing pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

ANALYSIS OF PRESTESS & METHODS OF PRESTESSING: I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT–III: (13+4)

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

ANALYSIS OF SECTIONS FOR FLEXURE: Elastic analysis of concrete beams prestRESSED with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – IV: (12+3)

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR:
Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

Text books:
1. Structural Design and Drawing (Concrete and Steel) by N. Krisna Raju, University press publications
4. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

References:
2. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.
Department of Civil Engineering  
B.Tech- 7th Semester  
SYLLABUS  
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)

Course Title: EARTHQUAKE RESISTANT DESIGN (Elective – IV)  
Course Code: CE4434  
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The student is expected to:

i). Create a strong understanding on application of single degree and multi-degree of freedom systems.

ii). Impart the knowledge on causes and effects of earthquakes.

iii). Formulate and analyze structures subjected to earthquake excitation.

iv). Familiarize with seismic codal and detailing provisions.

OUTCOMES:

On successful completion of this course, it is expected that students should be able to;

a) Analyze the free and forced vibration response of single-degree and multi-degree of freedom and continuous systems.

b) Distinguish between earthquake magnitude and earthquake damage (intensity),

c) Understand why earthquakes occur, how they are measured and categorized and the effect they may have on engineering structures. Predict the Dynamic Behavior of simple structural systems,

d) Develop an understanding of structural dynamics of simple systems subject to harmonic, impulse and/or arbitrary loading,

e) Employ the Response Spectrum Analysis Method for Earthquake resistant R/C Buildings,

f) Apply the Basic Principles of Conceptual Design for Earthquake resistant R/C Buildings. Understand the concepts and implementation of IS codes in relation to earthquake design.
UNIT – I

UNIT – II

UNIT – III


UNIT – IV

CODAL DETAILING PROVISIONS: - Review of the latest Indian Seismic codes IS:4326 and IS:13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

Text Books:
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi

References:
3. Structural Dynamics by Mario Paaz.

IS Codes: IS: 1893, IS: 4326 and IS:13920
Department of Civil Engineering  
B.Tech- 7th Semester  

SYLLABUS  
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)

Course Title: GROUND WATER HYDROLOGY (Elective-IV)  
Course Code: CE4435  
L: T: P: C: 3:1:0:4

OBJECTIVES:  

i) To introduce the subsurface occurrence and movement of the ground water.  
ii) To introduce the concepts of well hydraulics and quality analysis of ground water  
iii) To introduce the various surface and subsurface investigation techniques for ground water exploration  
iv) To provide the complete details of artificial recharge of ground water  
v) To introduce the various concepts of saline water intrusion in aquifers  
vi) To impart the knowledge on various techniques of modeling and management of ground water  

OUTCOMES:  

At the end of the course, students will be able to  
a) Understand the occurrence and movement of ground water in the earth’s subsurface.  
b) Apply principles of fluid mechanics to understand well behavior in different conditions  
c) Identify suitable surface and subsurface investigation techniques for the exploration of ground water  
d) Understand the concept of artificial recharge of ground water  
e) Apply the different principles to know the interface between saline water and fresh water  
f) Understand the various mathematical modeling techniques and management of ground water resources  

UNIT – I: INTRODUCTION, OCCURRENCE AND MOVEMENT OF GROUND WATER (11+3)  

INTRODUCTION : Global distribution of water, Ground water utilization & historical background, ground water in hydrologic cycle, ground water budget, Ground water level fluctuations & environmental influence, literature/ data/ internet resources, Characteristics of ground water, Role of groundwater in water resources system and their management.
OCCURRENCE: Origin & age of ground water, rock properties affecting groundwater, groundwater column, zones of aeration & saturation, aquifers and their characteristics/classification, groundwater basins & springs,

MOVEMENT OF GROUND WATER: Darcy’s Law, permeability & its determination, Dupuit assumptions, heterogeneity & anisotropy, Ground water flow rates & flow directions, Hydraulic conductivity, Aquifer transmissivity and storativity, Storage coefficient - Specific yield, Direct and indirect methods for estimation of aquifer parameters, Governing equation for flow through porous medium - Steady and unsteady state flow - Initial and boundary conditions, solution of flow equations.

UNIT-II: WELL HYDRAULICS, POLLUTION AND QUALITY ANALYSIS (11+3)

WELL HYDRAULICS: Steady/ unsteady, uniform/ radial flow to a well in a confined/ unconfined /leaky aquifer, well flow near aquifer boundaries/ for special conditions, partially penetrating/horizontal wells & multiple well systems, well completion/ development/ protection/ rehabilitation/ testing for yield, Wells near aquifer boundaries - Hydraulics of recharge wells.

POLLUTION AND QUALITY ANALYSIS OF GROUND WATER: Municipal /industrial /agricultural /miscellaneous sources & causes of pollution, attenuation/ underground distribution / potential evaluation of pollution, physical /chemical /biological analysis of ground water quality, criteria & measures of ground water quality, ground water salinity & samples, graphical representations of ground water quality.

UNIT – III: EXPLORATION, ARTIFICIAL RECHARGE AND SALINE WATER INTRUSION (11+3)

EXPLORATION OF GROUND WATER: Geological /geophysical exploration/ remote sensing / electric resistivity /seismic refraction based methods for surface investigation of ground water, test drilling & ground water level measurement, sub-surface ground water investigation through geophysical / resistivity /spontaneous potential /radiation / temperature / caliper / fluid conductivity / fluid velocity /miscellaneous logging.

ARTIFICIAL RECHARGE OF GROUND WATER: Concept & methods of artificial ground water recharge, recharge mounds & induced recharge, wastewater recharge for reuse, water spreading and application of RS and GIS techniques in site identification.

SALINE WATER INTRUSION: Ghyben-Herzberg relation between fresh & saline waters, shape & structure of the fresh & saline water interface, upcoming of saline water, fresh-saline water relations on oceanic islands, seawater intrusion in Karst terrains, saline water intrusion control.

UNIT – IV: MODELING, MANAGEMENT AND TRANSPORT PROCESS (12+6)

GROUND WATER MODELING: Ground water modeling through porous media /analog / electric analog / digital computer models.
GROUND WATER MANAGEMENT: Ground water basin management concept, hydrologic equilibrium equation, ground water basin investigations, data collection & field work, dynamic equilibrium in natural aquifers, management potential & safe yield of aquifers, stream-aquifer interaction, seepage from surface water, artificial recharge.


Text Books:

- "Ground water", S. Ramakrishnan.

References:

- Bear J., Dynamics of fluids in porous media, American Elsevier publishing co., inc, 1972.
Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)

Course Title: RETROFITING AND REHABILITATION OF STRUCTURES (Elective-IV)

Course Code: CE4436

L: T: P: C: 3:1:0:4

OBJECTIVES:

The student is expected to:

i) Recognize the mechanisms of degradation of concrete structures and conduct preliminary forensic assessment of deteriorated concrete structures;
ii) Learn how to conduct field monitoring and non-destructive evaluation of concrete structures;
iii) Assess alternative repair strategies for deteriorated concrete structures including repairing with composites;
iv) Evaluate stabilizing and strengthening techniques of reinforced concrete structural elements;
v) Carry out a study on a topic related to the durability and repair of concrete structures, author a technical paper on the study and present it verbally.

OUTCOMES:

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

a) Identify the probable reasons for the deterioration of various structural members
b) Able to assess the severity of damage in the structural members
c) Choose materials and appropriate technologies for repair.
d) Identify the appropriate method for strengthening of existing members.
e) Plan for the monitoring of the new buildings by using sensor technology.
UNIT – I: (9+4)
STRUCTURAL DAMAGE: Mechanism of Damage – Types of Damage.

UNIT – II: (11+4)
DIAGNOSIS AND DAMAGE ASSESSMENT: Inspection and Testing – Symptoms and Diagnosis of Distress - Damage assessment – NDT.

UNIT – III: (13+4)

UNIT – IV: (7+3)
MONITORING: Health Monitoring of Structures – Use of Sensors
BUILDING INSTRUMENTATION: Various instruments used in for monitoring structural behavior of building.

Text Books:
1. Concrete Technology by A.R. Santakumar, Oxford University press
3. Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University Press

References:
Department of Civil Engineering  
B.Tech- 7th Semester  

SYLLABUS  
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)  

Course Title: ENVIRONMENTAL HYDRAULICS AND ADVANCED WASTEWATER TREATMENT  
(Elective-V)  

Course Code: CE4437  
L: T: P: C:: 3:1:0:4  

OBJECTIVES:  
The course content enables students to:  
i). Learn about the horizon of the waste, like the hazardous waste from various industries and its characteristics and to get thorough knowledge of waste water treatment.  
ii). Understand treatment processes adopted by industries  
iii). Analyze the relative merits and economy of different waste treatment processes  
iv). Learns about requirements of distribution systems  
v). Identifies the merits and merits of sewerage systems.  

OUTCOMES:  
At the end of the course students are able to:  
a) Comprehends the importance of treatment of Liquid waste from various industries.  
b) Identifies liquid waste and characteristics at difference stages in various types of industries.  
c) Learn about the manufacturing process of various products in industries and how the waste is treated in various industries.  
d) Identifies the design requirements of distribution systems  
e) Identifies the suitability of sewerage system for a given site conditions.
UNIT-I  
BASIC THEORIES OF INDUSTRIAL WASTE WATER MANAGEMENT – Volume reduction –  
Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes  
and domestic sewage – consequent problems-  

SPECIAL TREATMENT METHODS – Adsorption – Reverse Osmosis – Defluoridation – Ion  
exchange – Ultra Filtration- Quality requirements of boiler and cooling waters – Industrial waste water  
discharges into streams. Lakes and oceans and problems - Quality requirements of process water for  
Textiles – Food processing - and Brewery Industries – Boiler and Cooling water treatment methods.  

UNIT-II  
WASTEWATER TREATMENT OF INDUSTRIAL EFFLUENTS: Textiles, Paper and Pulp  
industries, Tanneries, Fertilizers, Distilleries, Dairy, Sugar Mills, Steel Plants -Common Effluent  
Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.  

UNIT-III  
DISTRIBUTION SYSTEMS: requirements – methods and layouts-Design procedures- Hardy Cross and  
equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves  
and check valves water meters – laying and testing of pipe lines – pump house.  

UNIT-IV  
SEWAGE SYSTEM : Storm water estimation – time of concentration – storm water overflows combined  
basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements –  
sanitary fittings-traps – one pipe and two pipe systems of plumbing  

Text Books:  
2. Sewage disposal and air pollution Engineering by S K Garg,  

References:  
Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)

Course Title: PRESTRESSED CONCRETE DESIGN

Course Code: CE4438
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Compute the losses in PSC members
ii). Design PSC members subjectd to flexure and shear
iii). Analyze and Design for anchorage forces

OUTCOMES:

At the end of the course students are able to:

a) Describe the basic properties of prestressed concrete constituents.
b) Analyse the flexural behaviour of simple beams
c) Calculate prestress losses for simple prestressed concrete girders.
d) Design prestressed concrete girders for flexure using current design procedures
e) Recognize the effects of transfer and development length on flexural and shear strengths.
f) Construct moment-curvature and load-deflection curves for a prestressed concrete beam.
g) Analyse and design prestressed concrete members for shear.
UNIT – I
**LOSSES OF PRESTRESS:** Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT – IV
**ANALYSIS OF SECTIONS FOR FLEXURE:**
Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – V
**DESIGN OF SECTIONS FOR FLEXURE AND SHEAR:** Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

UNIT – VI
**ANALYSIS OF END BLOCKS:** Guyon’s method and Mugnel method, Anchorage zone strusses – Approximate method of design – Anchorage zone reinforcement – Transfer of prestress pre-tensioned members.

**Text books:**
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

**Reference:**
1. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.

**Codes:** BIS code on prestressed concrete, IS 1343.
Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)

Course Title: SOIL DYNAMICS AND MACHINE FOUNDATIONS (Elective-V)
Course Code: CE4439

OBJECTIVES:
The course content enables students to:

(1) To make familiarize students with the dynamic properties of soil.

(2) To create an understanding about the importance of designing machine foundation for reciprocating and impact machines

OUTCOMES:
At the end of the course students are able to:

(a) Students able to understand the basics of soil dynamics.
(b) Student will demonstrate the ability to design machine foundations.
Unit-I


Unit-II

**Wave Propagation and Dynamic Soil Properties:** Longitudinal and torsional waves in infinitely long rod; Solution for one-dimensional and three-dimensional equations of motion; Waves in semi-infinite body; Waves in layered medium; Earthquake waves – P-wave, S-wave, Rayleigh wave and Love wave; Locating earthquake's epicenter. Dynamic soil properties - Laboratory and field testing techniques, Elastic constants of soils. 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

**Machine foundation:** Empirical methods, design criteria and procedures for reciprocating machines, impact machine turbo generators, impulse type, construction details of machine foundations, vibration isolation, a seismic design beneficiary aspect of vibration. (Only design procedure for all types of machines)

Text Books:


References:

2. Das, B. M. - Principles of Soil Dynamics, PWS KENT publishing Company, Boston.
Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 8th FSI model)

Course Title: TRAFFIC ENGINEERING (Elective-V)                              Course Code: CE4440
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i). To understand the traffic characteristics and relations

ii). To build knowledge on traffic capacity and flow

iii). To build knowledge on parking problems and measures to accidents

iv). To learn signal design and traffic relation with environment

OUTCOMES:

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

a) identify traffic stream characteristics and studies

b) Build knowledge on traffic capacity and level of service

c) Discover parking problems and measures to accidents

d) Design traffic signal cycle and learn the measures for the traffic-environment problems
UNIT – I
TRAFFIC CHARACTERISTICS:
Basic traffic characteristics - Speed, volume and concentration. Relationship between Flow, Speed and Concentration

TRAFFIC MEASUREMENT AND ANALYSIS:
Volume Studies - Objectives, Methods; Speed studies - Objectives: Definition of Spot Speed, time mean speed and space mean speed; Methods of conducting speed studies.

UNIT – II
SPEED AND GAP ACCEPTANCE STUDIES:
Methods of conducting speed studies-Presentation of speed study data. Head ways and Gaps-Critical Gap-Gap acceptance studies.

HIGHWAY CAPACITY AND LEVEL OF SERVICE:
Basic definitions related to capacity-Level of service concept-Factors affecting capacity and level of Service-Computation of capacity and level of service for two lane highways Multilane highways and Freeways.

UNIT – III
PARKING STUDIES:
Types of parking facilities-on street parking and off street Parking -Parking studies and analysis. Accident studies and analysis.

ACCIDENTS MEASURES: Causes of accidents - The Road, The vehicle, the road user and the Environment; Engineering, Enforcement and Education measures for the prevention of accidents

UNIT – IV

TRAFFIC AND ENVIRONMENT: Detrimental effects of Traffic on Environment; Air pollution; Noise Pollution; Measures to curtail environmental degradation due to traffic.

Text Books:
2. Highway Engineering- S. K. Khanna & C.E.G Justo, Nem Chand & Bros., Publisher

Reference Books:
Department of Civil Engineering  
B.Tech- 7th Semester  
SYLLABUS  
(Applicable for the batches admitted from 2013-14 Non-FSI & FSI model)

Course Title: ENVIRONMENTAL ENGINEERING LAB  
Course Code: CE4241  
L: T: P: C:: 0:0:3:2

OBJECTIVES:

i). The course content enables students to:
ii). Determine of pH and Electrical Conductivity
iii). Estimate total Hardness
iv). Determine of Alkalinity, Acidity of given water sample
v). Determine chlorides, Iron, total solids, dissolved solids in water
vi). Determine D.O B.O.D/COD.

OUTCOMES:

At the end of course student will be able to

a) know how to perform relevant tests in the laboratory to determine the major characteristics of water and wastewater
b) Get hands on experience in operating the various equipment/methods available for examining water and wastewater
c) understand the practical significance of the characteristics, the relevant codes of practice for examination and permissible limits for the characteristics of water and wastewater

LIST OF EXERCISES:

i). Determination of pH and Electrical Conductivity
ii). Determination and estimation of total Hardness
iii). Determination of Calcium and Magnesium hardness
iv). Determination of Alkalinity
v). Determination of Acidity
vi). Determination of chlorides in water and soil.
 vii). Determination and estimation of total solids, dissolved solids
viii). Determination of Iron
ix). Determination of dissolved oxygen with D.O Meter & Winklers Method
x). Physical parameters-Temperature, Turbidity
xi). Determination of B.O.D/COD
xii). Determination of chlorine demand
xiii). Determination of optimum coagulant dose
Course Title: STRUCTURAL MODELING & DESIGN LAB
Course Code: CE4242
L: T: P: C:: 0:0:3:2

OBJECTIVES:

Learner is expected to

i). Model, analyze and design simple steel frames subjected practical loads.
ii). Model, analyze and design steel trusses of various shapes used in the field
iii). Model, analyze the given multi storied structure.
iv). Design the reinforcement in beams, slabs and stair cases.
v). Design the reinforcement in retaining walls and water tanks.

OUTCOMES:

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

a) Validate the results of analysis and design of portal frame
b) Analyze and Interpret of results of analysis of Steel trusses used in practice
c) Model, analyze and design the components of multi storied RCC framed structure
d) Interpret and cross check the reinforcement provided in the construction sites of buildings.
e) Interpret and cross check the reinforcement provided in the construction sites of retaining walls and water tanks.

EXPERIMENTS TO BE PERFORMED (MIN 8 EXPERIMENTS)

ANALYSIS AND DESIGN USING STAAD

1. Analysis and design of portal frame
2. Analysis and Interpretation of Results of Analysis of Steel trusses
3. Analysis and Interpretation of Results of Analysis of RCC Frame.

RCC WORKING DRAWINGS

Plate 1 Detailing of Continuous beams
Plate 2 Detailing of Continuous slabs and stair case
Plate 3 Detailing of flat and grid slab
Plate 4 Detailing of combined footing and retaining wall
Plate 5 Detailing of rectangular and circular water tanks

SOFTWARE REQUIRED: STAAD PRO.

All experiments are compulsory.
Course Title: CONSTRUCTION COSTING AND MANAGEMENT

OBJECTIVES:

i). Learn the quantity estimation of the different components of the civil engineering structures

ii). Learn the cost estimate of the different components of the civil engineering structures.

iii). Organize and schedule of estimating work.

iv). Clearly understand the cost management discipline and process.

v). Use a cost management estimation and control plan

OUTCOMES:

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

a) Identify, analyze and solve the complex problems that deal with estimation of buildings and pavements.

b) Perform cost analysis of Civil Engineering projects.

c) Establish relationship between cost and quality of the construction process.

d) Manage and administer construction contracts.

e) Estimate the value of existing infrastructure.
PART-A

UNIT – I (12+3)
RATE ANALYSIS: Working out data for various items of work over head and contingent charges. Standard specifications for different items of building construction.

UNIT – II (10+4)
REINFORCEMENT BAR BENDING SCHEDULES: Reinforcement bar bending and bar requirement schedules.
VALUATION OF BUILDINGS: Valuation of various components of buildings

UNIT – III (11+3)
CONTRACTS: Types of contracts - Contract Documents - Conditions of contract.
PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart, CPM and PERT Network planning. Computation of times and floats – their significance.

PART-B (12+5)
DETAILED ESTIMATES OF BUILDINGS: Individual wall method and center line method.

TEXT BOOKS:
2. Estimating and Costing by G.S. Birdie
3. PERT and CPM – Project planning and control with by Dr.B.C.Punjma & Khandelwal – Laxmi publications.

REFERENCES:
2. I. S. 1200 (Parts I to XXV - 1974/ method of measurement of building and Civil Engineering works - B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
Course Title: DESIGN OF STEEL STRUCTURES
Course Code: CE4444
L: T: P: C:: 2:0:3:4

OBJECTIVES:

The course content enables students to:
   i). Understand the fundamental principles and procedures of structural steel design;
   ii). Understand the versatility of Steel structures based on requirement
   iii). Apply the principles of steel design to real world problems;
   iv). Design basic steel members subjected compression, tension and bending as per IS 800 codal

OUTCOMES:

At the end of the course the learners will be able to
   a) Apply the basic requirements of the IS design specifications.
   b) Apply the concepts of strain compatibility and equilibrium concepts to determine the strength of members made of steel
   c) Design for welded connections between steel members
   d) Design simple steel members subjected compression, tension bending and their combinations
UNIT – I
MATERIALS AND CONNECTIONS: (11+4)
Properties of Structural Steel, I. S. Rolled Sections, I. S. Specifications,
Welded connections: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections only.

DESIGN OF TENSION MEMBERS:
Introduction to different modes of failures – gross section yielding, Net Section rupture and block shear failure. Determines the design strength due to yielding of gross section, rupture of critical section and block shear. Design procedure of tension members.(simple problems)

COMPRESSION MEMBERS: Effective length of columns. Slenderness ratio – permissible stresses. Design procedure of compression members – problems on simple sections only (no builtup sections).

UNIT – II
BEAMS: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams, check for deflection, shear, buckling, check for bearing, laterally supported beams only.

DESIGN OF BUILT UP COLUMNS: Necessity & design of built up columns, laced and batten columns including the design of lacing and battens.

FOUNDATIONS: Column bases: Slab base, Gusset base.

UNIT–III
PLASTIC ANALYSIS: Introduction, plastic hinge concept, plastic modulus, shape factor, upper and lower bound theorems, collapse mechanisms, combined mechanism, plastic analysis of beams and portal frames by equilibrium and mechanism methods.

PLATE GIRDER: Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (only introduction).

UNIT – IV
GANTRY GIRDERS: Introduction, various loads, specifications, design of gantry girder.

DESIGN OF MEMBERS OF ROOF TRUSS: Design of purlins ONLY. Introduction to pre-engineered structures, concepts and advantages, disadvantages.

Note: All the designs should be taught in the limit state design method as per IS 800-2007.welding connections to be used.

DRAWINGS: 1. Detailing of built up columns, laced and batten columns
         2. Detailing of Plate girder including curtailment, splicing and stiffeners.
         3. Detailing of Gantry girder including curtailment, splicing and stiffeners
         4. Roof truss.

These codes and steel tables are permitted in the examinations.

IS Codes:
1) IS -800 – 2007
2) IS – 875 – Part III
3) Steel Tables.
Text Books:
1. Design of Steel structures – N. Subramanian, Oxford University Press.
2. Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi
4. Structural Design and Drawing by N.KrishnaRaju; University Press, KAKINADA

References:
2. Design of steel structures by Limit State Method as per IS: 800-2007 – S.S. Bhavikatti
   IK Internatinoal Publishing House, Bangalore – 560 001..
3. Structural design in steel by SarwarAlamRaz, New Age International Publishers, New Delhi
4. Design of Steel Structures by P.Dayaratnam; S. Chand Publishers
Department of Civil Engineering
B.Tech- 8th Semester
SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 7th FSI model)

Course Title: AIRPORT AND HARBOUR ENGINEERING (Elective-IV OR V OR VI)
Course Code: CE4445
L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). Build knowledge on airport planning and design considerations
ii). Build knowledge on runway design and its considerations
iii). Understand the requirements to plan the docks and harbors
iv). Build knowledge on design and maintain considerations of docks and harbors

OUTCOMES: At the end of the course the learners will be able to

a) Model the airport layout with all features
b) Design runway based on terrain
c) Model the docks and harbors layout
d) Design structures and non-structures and their maintenance in docks and harbors
UNIT-I
AIRPORT PLANNING AND DESIGN: Airport site selection – Air craft characteristics – Zoning laws – Airport classification

AIRPORT DESIGN: Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

UNIT- II


UNIT- III
PLANNING AND LAYOUT SHORE STRUCTURES: Definition of Terms - Harbors, Ports, Docks, Tides and Waves, Dredging, Littoral Drift, Sounding, Area, Depth, Satellite Ports - Requirements and Classification of Harbors.

Site Selection & Selection Investigation, Shore Considerations - Proximity to Towns/Cities, Utilities, Construction Materials, Coast Lines, Dry and Wet Docks

PLANNING AND LAYOUT OFF SHORE STRUCTURES: Planning and Layouts. Terminal Facilities – Port Buildings, Warehouse, Transit Sheds, Inter-modal Transfer Facilities, Mooring Accessories

UNIT-IV
CONSTRUCTION OF DOCKS & HARBOURS: Coastal Structures- Piers, Breakwaters, Wharves, Jetties, Quays, Spring Fenders Coastal Shipping, Inland Water Transport and Container Transportation. Pipe Ways, Rope Ways

MAINTENANCE OF DOCKS & HARBOURS: Maintenance of Ports and Harbors – Navigational aids.

Text Books:
1. Airport Engineering- Khanna & Arora- nemchand Bros, new Delhi
2. Airport engineering Virendrakumar, DhanpathiRai Publishers, new Delhi
3. Docks and Harbour Engineering, Bindra S.P- DhanpathiRai & Sons, New Delhi

References:
Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 7th FSI model)

Course Title: DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(Elective-IV OR V OR VI)

Course Code: CE4446
L: T: P: C: 3:1:0:4

OBJECTIVES:
The learner is expected to

i). Study the design and drawing of hydraulic Structures such as Surplus weir, Tank sluices with tower head, Canal drop, Canal regulator, under tunnel and siphon aqueduct.

ii). Relate substructure components of irrigation canals and irrigation head works.

OUTCOMES:
At the end of the course the learners will be able to

a) Identify design components of various irrigation structures
b) Create the drawings of various irrigation structures.
c) Illustrate the component parts of Hydraulic structures
d) Summarize the requirements of irrigation design engineers in large and small consulting firms, and at all levels of government and Private sectors

SYLLABUS:
1. SURPLUS WEIR.
2. TANK SLUICE WITH TOWER HEAD
3. TYPE III SYPHON AQUEDUCT.
4. TRAPEZOIDAL NOTCH FALL.
5. CANAL REGULATOR.
6. UNDER TUNNEL

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.

REFERENCES:
1. Design of minor irrigation and canal structures by C. Satyanarayana Murthy, Wiley eastern Ltd.
Course Title: GROUND IMPROVEMENT TECHNIQUES (Elective-IV OR V OR VI)

Course Code: CE4447
L: T: P: C: 3:1:0:4

OBJECTIVES:

i). Understand the modern methods of treating soils in order to improve their engineering properties.

ii). Explain the underlying principles of the different methods of ground treatment

iii). identify when such treatment may be necessary what results can be expected in different soil types

OUTCOMES:

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

a) Interpret the concepts behind a range of ground improvement and soil remediation techniques.

b) Find out the advantages, disadvantages, limitations for each ground improvement method discussed.

c) Choose appropriate techniques for a range of ground and site conditions.

d) Identify criteria to determine the applicability of each ground improvement method for a specific project and soil condition under consideration.
UNIT – I
DEWATERING: Methods of de-watering - sumps and interceptor ditches - single, multi stage well points - vacuum well points - Horizontal wells - foundation drains - blanket drains - criteria for selection of fill material around drains - Electro-osmosis.

GROUTING: Objectives of grouting - grouts and their properties - grouting methods - ascending, descending and stage grouting - hydraulic fracturing in soils and rocks - post grout test.

UNIT – II
IN – SITU DENSIFICATION METHODS IN GRANULAR SOILS: Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

IN – SITU DENSIFICATION METHODS IN COHESIVE SOILS: Preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – III
STABILISATION: Methods of stabilization – mechanical – cement – lime – bituminous - chemical stabilization with calcium chloride - sodium silicate and gypsum


UNIT – IV
GEOSYNTHETICS: Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.


Text Books:

References:
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jersey, USA
Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for the batches admitted from 2013-14 7th and 8th semester non-FSI & 7th FSI model)

Course Title: PAVEMENT MANAGEMENT SYSTEMS     (Elective-IV OR V OR VI)

Course Code: CE4448
L: T: P: C: 3:1:0:4

OBJECTIVES: The course content enables students to:

1) Understand the science and engineering of pavement management systems from the perspective of pavement evaluation, design objectives and constraints.
2) Develop knowledge in the construction of pavement and understanding its features with a technical sense
3) Learn the theoretical basis of subject and to derive the theories of the pavement evaluation.
4) Know various probable alternatives to describe the Pavement condition.

OUTCOMES: At the end of the course the learners will be able to:

1) Obtain a basic Knowledge of the fundamental issues in pavement management system.
2) Gain Knowledge on structural and functional evaluation of pavements.
3) Learn types of distress and surveys done on the pavement
4) Build Knowledge on alternatives in pavement distress management
Unit – I  
(Pavement components Management Levels and functions: Definition -Components of Pavement Management Systems, Essential features. Ideal PMS- Network and Project levels of PMS-Influence Levels- PMS Functions- Function of Pavement evaluation)

Unit – II  

Unit – III  
(Pavement Design Selection and Alternatives: Design objectives and constraints, basic structural response models, physical design inputs, alternate pavement design strategies and economic evaluation, life cycle costing, analysis of alternate pavement strategies based on distress and performance, case studies. Equipments)

Unit – IV  
(Expert Systems and Pavement Management: Role of computers in pavement management, applications of expert systems for managing pavements, expert system for pavement evaluation and rehabilitation, knowledge-based expert systems, case studies.

Project Appraisal:
Project appraisal - private sector participation-Environmental impact assessment-TQM in highway projects)

Text Books:
2. Highway Engineering- S. K. Khanna & C.E.G Justo, Nem Chand & Bros., Publisher

References: