



SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY- TUMAKURU
(A constituent College of Siddhartha Academy of Higher Education, Tumakuru)



Scheme of Teaching and Examination 2018-19

VII Semester B.E. (Civil Engineering)						Teaching Hours/week			
SI No.	Course and Course Code		Course Title	Teaching dept.	Board of Exam.	L	T	P	C
01	PC	18CE701	Design of Steel Structures	CE	CE	3	0	0	3
02	PC	18CE702	Quantity Surveying & Estimation	CE	CE	3	0	0	3
03	PC	18CE7PE3x	Program Elective-III	CE	CE	3	0	0	3
04	PC	18CE7PE4x	Program Elective-IV	CE	CE	3	0	0	3
05	PC	18CE705	Environmental Engineering Laboratory	CE	CE	0	0	2	1
06	PC	18CE706	Internship	CE	CE	0	0	2	1
07	PC	18CE7PW01	Project PHASE - I	CE	CE	0	0	4	2
08	PC	18CE7TS01	Technical seminar	CE	CE	0	0	0	1
Total						12	0	8	17

Program Elective III:

18CE7PE31 Design of Prestressed Concrete Structures

18CE7PE32 Advance Design of RC Structures

18CE7PE33 Earthquake Resistant Design of Structures

Program Elective IV:

18CE7PE41 Highway Geometric Design

18CE7PE42 Numerical Methods in Civil Engineering

18CE7PE43 Remote Sensing & GIS

HOD, Civil Engineering Department

Dean (Academic)



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VIII Semester B.E. (Civil Engineering)						Teaching Hours/week			
SI No.	Course and Course Code		Course Title	Teaching dept.	Board of Exam.	L	T	P	C
01	PC	18CE8PE1x	Program Elective-V	CE	CE	3	0	0	3
02	PC	18CE8PE2x	Program Elective-VI	CE	CE	3	0	0	3
03	PC	18CE8PE3x	Program Elective-VII	CE	CE	3	0	0	3
04	PC	18CE8PW02	Project PHASE - II	CE	CE	0	0	14	7
Total						9	0	14	16

Program Elective-V:

18CE8PE11	Design and drawing of RCC and steel structures
18CE8PE12	Advanced Foundation Design
18CE8PE13	Solid Waste Management

Program Elective-VI:

18CE8PE21	Bridge Engineering
18CE8PE22	Structural Dynamics
18CE8PE23	Urban Transport Planning

Program Elective-VII:

18CE8PE31	Pavement Design
18CE8PE32	Finite Element Analysis
18CE8PE33	Air Pollution and Control

HOD, Civil Engineering Department

Dean (Academic)



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Syllabus for the Academic Year - 2021 - 2022

Department: CIVIL ENGINEERING

Semester: VII

Subject Name: DESIGN OF STEEL STRUCTURES

Subject Code:18CE701

L-T-P-C: 3-0-0-3

Course Objectives :

Sl.No	Course Objectives
1	To provide an exposure on basic concepts of Steel structure,IS steel code provisions, and plastic behavior of structural steel.
2	To understand the basics of Bolted connections and Welded connections
3	To learn the design of tension members and design of compression members
4	To learn the design of laterally supported and UN-supported steel beams.

Note: Study of this course should be based on IS: 800-2007



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UNIT	Description	Hours
I	INTRODUCTION: Advantages and Disadvantages of Steel structures, Loads and Load combinations, Design considerations, Limit State Method (LSM) of design, Codes, Specifications and section classification.(No Problems) Plastic Behavior of Structural Steel: Introduction, Plastic theory, Plastic hinge concept, Plastic collapse load, conditions of plastic analysis,	7
II	BOLTED CONNECTIONS: Introduction, Behavior of Bolted joints, Design strength of ordinary Black Bolts, Design strength of High Strength Friction Grip bolts (HSFG), Moment resistant eccentric connections, WELDED CONNECTIONS: Introduction, Welding process, Advantages of Welding, Types and Properties of Welds, Types of joints, Weld symbols, Weld specifications, Design of welds, Simple joints, Moment resistant eccentric connections, Continuous Beam to Beam connections, Beam Column splices.for both bolted and welded connection	8
III	DESIGN OF TENSION MEMBERS: Introduction, Types of tension members, Modes of failure, Factors affecting the strength of tension members, Angles and Other sections under tension, Design of tension member with Lug angles and Splices,	8
IV	DESIGN OF COMPRESSION MEMBERS: Introduction, Failure modes, Behaviour of compression members, Sections used for compression members, Effective length of compression members, Design of compression members with lacing and battens	8
V	DESIGN OF BEAMS: Codal provisions, Lateral buckling, Web buckling and crippling, Analysis of laterally restrained and unrestrained beams.	8



Course Outcomes

Course outcome	Descriptions
CO1	Course gives an analysis on the basic concept of steel structure and plastic analysis
CO2	Course gives the details how to design steel structures using welded and bolted connections
CO3	Course gives information to design tension members, compression members using steel sections
CO4	Course gives information to design steel columns, beams

Question paper Pattern:

1. The question paper will have 5 units comprising of ten questions. Each full question carrying 20 marks.
2. There will be two full questions with a maximum of three subdivisions from each unit.
3. The students shall answer five full questions, selecting one full question from each unit.
4. If more than one question is answered in unit, best answer will be considered for the award of marks limiting one full question answer in each unit

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Design of Steel Structures By Limit State Method	S. S. Bhavikatti	Second Edition, I K International Publishing House, India, 2010
2	Limit State Design of Steel Structures	S. K. Duggal,	Tata McGraw Hill Education Private Limited, New Delhi, India, 2015
3	Design of Steel Structures	N. Subramanyam	Oxford University Press, New Delhi, india, 2016. Third Edition



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Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Design of steel structures	Dr N.Rama Chandra and Virendra Gehlot,	Scientific Publishers, india , 2009
2	Design of Steel Structures	Dr N.Ramachandra.	Vol 2 2018 standarad book house new Delhi
3	Design of Steel Structures	P. Dayarathnam	Prentice Hall India, New Delhi, india, edition 2,2011
4	IS800-2007, & Steel tables	Bureau of Indian Standards,	General Construction in Steel Code Practice 3 rd edition



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Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Quantity Surveying and Estimation

Subject Code: 18CE702

L-T-P-C: 3-0-0-3

Course objectives :

Sl no	Course objectives
1	This course will enable students to learn to Estimate the quantities and cost of work
2	This course will enable students to learn about different rate analysis and develop the bill of quantities and arrive at the cost of civil engineering projects
3	This course will enable students to build the skill to prepare different types of estimates and approximate estimates and approximate estimation of Civil Engineering work.
4	This course will enable students to gain knowledge to place tender, how to maintain quality and administrative approval process for the contract called by government and private authorities.



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UNIT	Description	Hours
I	Estimation: study of various drawings with estimates, important terms, units of measurements, abstract methods of taking out quantities and cost of center line method, long wall and short wall method. Preparation of detailed and abstract estimates for One BHK residential building.	15
II	Estimates: Manhole, Septic Tank & Soak Pit, RCC Box Culvert and Rectangular RCC Beam.	6
III	Rate Analysis: Definition and purpose, working out quantities and rates for the following standard items of work- CC 1:4:8 for floor, CC M-20 for RCC column, CC M-25 for RCC slab, First Class BBM in CM 1:6, Solid Block Masonry in CM 1:6 for 20cm/ 15cm thick wall, 2-layer WBM for Village Road, Plastering in CM 1:4 for 20mm thick, Vitrified Tiles for Flooring in CM 1:4, SSM in CM 1:8 for Foundation, Teak Wood Doors and Frames.	6
IV	Measurement of Earthwork for Roads: Methods for computation of earthwork sections, Mid section formula and mean sectional area method, trapezoidal & Prismoidal formula with and without cross slopes.	6
V	Approximate Estimation: Different types of estimates, approximate methods of estimating buildings and cost of materials. Short note on: Types of contract, Tender, earnest Money deposit (EMD), Security Deposit (SD), Quality Control (QC), Administrative approval and Technical sanction, Nominal Muster Roll (NMR), Measurement Books (MB). Introduction to Karnataka transparency act in public procurements.	6

Course Outcomes

Course outcome	Descriptions
CO1	Student will be able to prepare detailed and abstract estimates for building, manhole, septic tank. RCC culvert.
CO2	Students are able to make estimates for earth work in embankment and cutting with or without lateral slopes.
CO3	Students are able to make rate analysis for civil engineering works.
CO4	Students are able to write short notes on terms in departmental procedure.



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Text Books:

S1 No	Text Book title	Author	Volume and Year of Edition
1	Estimating & Costing,	B. N. Dutta	UBSPD Publishing House, New Delhi 22 edition
2	Estimating & Specification	S.C. Rangwala	Charotar Publishing House Pvt. Ltd., 2015.

Reference Book:

S1 No	Text Book title	Author	Volume and Year of Edition
1	Estimating, costing, specification and valuation in Civil Engg	Chakraborti N	Dhanpath Rai and sons New Delhi. 2014
2	Contracts and Estimates	B. S. Patil	University Press, 2006.
3	Estimating and costing	Vazirani V.N and Chandola S.P,	Khanna Publishers, 2015



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Design of Prestressed Concrete Structures

Subject Code: 18CE7PE31

L-T-P-C: 3-0-0-3

Course Objectives

Sl.No	Course Objectives
1	This course will enable students to learn basic principles of prestressing elements.
2	To learn about losses and deflection of prestressed members
3	To learn design of prestressed concrete elements subjected to flexure and shear.
4	Enable students to learn design of end blocks.

UNIT	Description	Hours
I	Materials :High strength concrete & steel, Stress-Strain characteristics and properties. Basic Principles of Prestressing : Fundamentals, Load balancing concept, Stress concept, Centre of Thrust. Pre-tensioning and post-tensioning systems, tensioning methods and end anchorages. Analysis of Sections for Flexure : Stresses in concrete due to pre-stress and loads, stresses in steel due to loads, Cable profiles	8
II	Losses of Pre-stress : Various losses encountered in pre-tensioning and post tensioning methods, determination of jacking force.	7
III	Deflections : Deflection of a pre-stressed member Short term and long term deflections, Elastic deflections under transfer loads and due to different cable profiles. Deflection limits as per IS 1343. Effect of creep on deflection, load verses deflection curve, methods of reducing deflection	8



IV	Design of Section for Flexure: IS Code recommendations Ultimate flexural strength of sections. Design of Shear: IS Code recommendations, shear resistance of sections, shear reinforcement. Limit state of serviceability control of deflections and cracking.	8
V	Design of End Blocks: Transmission of prestress in pretensioned members, transmission length, Anchorage stress in post-tensioned members. Bearing stress and bursting tensile force-stresses in end blocks- Methods, I.S. Code, provision for the design of end block reinforcement.	8

Course Outcomes

Course outcome	Descriptions
CO1	Students will be able to assess the requirements of PSC members.
CO2	To design PSC member after studying losses and deflection
CO3	To design PSC beam for flexure and shear
CO4	To design end blocks

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Pre-stressed Concrete	N. Krishna Raju	Tata McGraw Hill Publishing Company, New Delhi 2016
2	Design of pre-stressed concrete structures	T.Y. Lin and Ned H. Burns	John Wiley & Sons, New York.2015



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Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Prestressed Concrete Structures	P. Dayarathnam	Oxford & IBH-Pubs Company, Delhi, 5th Edition
2	Pre - stressed Concrete	Pundit G S and Gupta S P	C B S Publishers, New Delhi 4 th edition 2017
3	IS : 1343		Indian standard 2012



Syllabus for the Academic Year – 2021 – 2022

Department: Civil Engineering

Semester: VII

Subject Name: Advance Design of RC Structures

Subject Code: 18CE7PE32

L-T-P-C: 3-0-0-3

Course Objectives

Sl.No	Course Objectives
1	This course will enable students to learn advanced design of RCC elements
2	To make student to understand design concept of RCC tank
3	To make student to understand design concept of Grid Floor Slab
4	To make student to understand design concept of Grid Design of Flat slab & Roofs

UNIT	Description	Hours
I	Design of RCC overhead circular and rectangular water tanks with supporting towers. Design of silos, bunkers using Janssen's Theory and Airy's Theory	8
II	Design of RCC Chimneys. Introduction to shell and folded plate roofs, their forms and structural behavior. Design of simple cylindrical shell roof by beam theory.	8
III	Yield line analysis of slabs by virtual work. Yield line analysis by equilibrium methods	8
IV	Design of Grid Floors Slabs by approximate method	8
V	Design of flat slabs by Direct Designer Method (with and without drops)	7



Course Outcomes

Course outcome	Descriptions
CO1	Students will be able to design water tanks silos bunker.
CO2	Students will be capable of designing chimneys folded plates shell roofs.
CO3	Students will be able to design slabs using yield line analysis.
CO4	Students will be able to Design different types of floor systems like flat slab and grid slab.

Question paper Pattern:

1. The question paper will have 5 units comprising of ten questions. Each full question carrying 20 marks.
2. There will be two full questions with a maximum of three subdivisions from each unit.
3. The students shall answer five full questions, selecting one full question from each unit.
4. If more than one question is answered in unit, best answer will be considered for the award of marks limiting one full question answer in each unit

Text Books:

S1 No	Text Book title	Author	Volume and Year of Edition
1	Advanced Reinforced Concrete Design	N Krishna Raju	CBS; 2 edition 2010
2	Advanced Reinforced Concrete Design	P.Cvarghese	PHI Learning Pvt.Ltd 2009
3	Advanced Reinforced Concrete Design	S.SBhavikatti	New Age International,2008



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Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Reinforced Concrete Structures	B C Punmia	Vol-II Laxmi Publications (P) Ltd, New Delhi.
2	Limit State Design of Reinforced Concrete	P C Varghese	Vol-II- Prentice Hall of India (P) Ltd, New Delhi.
3	Plain and Reinforced Concrete	Jai Krishna and Jain	Vol-II Nem Chand Bros, Roorkee
4	IS 456 2000 IS 3370	BIS	1967 (Part I, II and IS 1893)



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Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Earthquake Resistant Design of Structures

Subject Code: 18CE7PE33

L-T-P-C: 3-0-0-3

Course objectives:

Sl no	Description
1	To understand the fundamentals of engineering seismology and seismic performance of buildings.
2	Irregularities in building which are detrimental to its earthquake performance.
3	Different methods of computing the seismic lateral forces for framed and masonry structures.
4	The requirements of Earthquake resistant design for RCC and Masonry structures.

UNIT	Description	Hours
I	Engineering Seismology: Terminologies-Focus, Focal depth, Epicenter, Causes of Earthquakes; Elastic rebound theory and Theory of plate tectonics; Classification of Earthquakes; Types and characteristics of seismic waves; Magnitude and intensity of earthquakes, Earthquake ground motion characteristics: Amplitude, frequency and duration; Seismic zoning map of India.	7



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II	Seismic Performance of Buildings: Structural configuration for earthquake resistant design, Overall Form, Simplicity, Uniformity, and Symmetry. Effect of Structural Irregularities on seismic performance of RC buildings. Vertical irregularity, plan irregularity, mass irregularity and stiffness irregularity. Architectural aspects of earthquake resistant buildings, Seismic-resistant building architecture, lateral load resistant systems and building characteristics.	7
III	Design philosophy and Earthquake Effects on Structures: Seismic design philosophy, Response spectrum-Definition, construction, Characteristics, Response to ground acceleration, torsional response of buildings. Procedure for seismic analysis of RC buildings using Equivalent static lateral force method as per IS 1893:2016. Numerical problems on above.	8
IV	Seismic analysis and ductile detailing: Reinforced Concrete Beams, Seismic Design of Ductile Reinforced Concrete column, Concept of weak beam-strong column, Detailing of Beam-Column Joints to enhance ductility, Ductile Detailing as per IS 13920:2016, Concept of soft and weak storey.	9
V	Earthquake Resistant Design of Masonry Buildings: Performance of Unreinforced, Infill Masonry Walls, Box Action, Lintel and sill Bands. Earthquake resistant design of masonry buildings-elastic properties of structural masonry, lateral load analysis of masonry buildings as per IS 13828:1993.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the theories responsible for occurrence of earthquakes and seismology.
CO2	Derive the elastic response spectra and design spectra in the design of earthquake resistant buildings.
CO3	Analyze the problems associated with structural configuration in the seismic performance of buildings.
CO4	Describe the need for ductile detailing of RC structures and masonry buildings.



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	“Earthquake resistant design of structures”, Prentice Hall of India, New Delhi.	Pankaj Agarwal and Manish Shrikande	5th Edition, 2008
2	“Earthquake Resistant Design of Structures”, Oxford University Press.	S K Duggal	6th Edition, 2009
IS Codes			
3	IS 1893:2016, Indian Standard Criteria for Earthquake Resistant Design of Structures.		
4	IS 13920:2016, Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces.		
5	IS13828:1993, Indian Standard Guidelines for Improving Earthquake Resistance of Low Strength Masonry Buildings.		

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	“Seismic Analysis of Structures”, John Wiley & Sons.	T K Datta	3rd Edition, 2009
2	“Dynamics of Structures: Theory and Applications to Earthquake Engineering”, John Wiley & Sons.	Anil K Chopra	3rd Edition, 2009
3	“Concepts in Earthquake Behaviour of Buildings”, Pearson Education.	C V R Murty, Rupen Goswami, A R Vijayanarayanan & Vipul V Mehta	2 nd Edition, 2005
4	“Earthquake resistant design and risk reduction”, John Wiley & Sons.	David Dowrick	1 st Edition, 2006



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Highway Geometric design

Subject Code: 18CE7PE41

L-T-P-C: 3-0-0-3

Course objectives :

Sl no	Course objectives
1	Students will be able to understand design of various geometric elements.
2	to enhance their knowledge about analysis and design of sight distances
3	to design horizontal and vertical curves with various elements related.
4	to design rotary intersection and highway drainage system

UNIT	Description	Hours
I	Introduction: Geometric Control factors like Topography -design speed design vehicle, Traffic and volume Capacity, environment and other factors as per IRC standards and specifications; PCU concept factors controlling PCU for different design purpose	06
II	Cross Sectional Elements: Pavement surface characteristics, friction, skid resistance of pavement unevenness, light reflecting characteristics, camber objectives types of camber, methods of providing cambers, in the field. Problems, carriage way, kerb, median, shoulder, foot path, parking lanes, service roads, cycle tracks, Driveways, Right of way. Factors influencing right of way. Design of Road humps as per latest IRC provisions.	08
III	Sight Distance: Importance, types, Sight distance at uncontrolled intersection, derivation, factors affecting sight distance, OSD, derivation, IRC, problems on above. Horizontal Alignment: Definition, Checking the stability of vehicle, while moving on horizontal curve, Super elevation, Ruling minimum and maximum radius, Assumptions, problems. Method of providing super elevation.Extra	10



	widening of pavement on curve, objective. Transition curve, objectives. Ideal requirements, types of transition curve. Method of evaluating length of transition curve, setting the transition curve in the field, set back distance on horizontal curve and problems on above	
IV	<p>Vertical Alignment: Gradient, Types of gradient. Design criteria of summit and valley curve. Design of vertical curves, based on SSD & OSD night visibility considerations. Design standards for hilly roads problems on the above.</p> <p>Intersection Design: Principles, interactions at grade and Grade separated interactions. Types of channelization. Features of channelising island median opening. Gap in median at junction.</p>	08
V	<p>Rotary Intersection: Elements Advantages and Disadvantages Design guide lines problem on the above Grade separated intersection. Three legged inter section Diamond inter change. Half clover leaf, clover leaf, Advantages- Disadvantages only</p> <p>Highway Drainage: Importance, sub surface drainage surface drainage Design of road side drain. Hydrological and Hydraulical considerations and design of filter media, problems on above.</p>	07

Course Outcomes

Course outcome	Descriptions
CO1	Students will learn about Geometric Control factors, IRC, standards and specifications for various geometric designs, and PCU concept.
CO2	Students will learn about various cross sectional elements and design of road humps as per IRC provisions.
CO3	Various geometric elements are designed like SSD, OSD, horizontal and vertical elements.
CO4	Students will be able to design rotary intersection and highway drainage system



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Highway Engineering	Khanna, CEC Justo and Veeraraghavan	Nemchand & Bros
2	Principle and practice of Highway Engineering	L.R.Kadiyalli and N.B.Lal	Khanna publications

Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Principles, practice and design of Highway Engineering	S.k.Sharma	S.Chand Technical publications
2	IRC codes(Relevant)		



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: NUMERICAL METHODS IN CIVIL ENGINEERING

Subject Code: 18CE7PE42

L-T-P-C: 3-0-0-3

Course Objectives

Sl.No	Course Objectives
1	To educate the students on the availability of various numerical methods of Integration
2	To educate the students on the availability of various numerical methods in Ordinary Differential Equation
3	To educate the students on the availability of various numerical methods in different domain of structural mechanics of civil engineering.

UNIT	Description	Hours
I	Introduction: Historical development of Numerical techniques, role in investigations, research and design in the field of civil engineering Development of Algorithm/ Flow Charts for Following Methods for Solution of Linear Simultaneous Equation: a) Gaussian elimination method, b) Gauss-Jordan matrix inversion method, c) Gauss-Siedel method d) Factorization method	8
II	Application of Solution of Linear System of Equations to Civil Engineering Problems: Construction planning, slope deflection method	8
III	Application of Numerical Integration For Solving Simple Beam Problems: Development of algorithm for a) Trapezoidal rule and b) Simpson's one third rule and its application for computation of area of BMD drawn for statically determinate beams. New Marks method for computation of slopes and deflections in statically determinate beams	8



IV	Development of algorithm and application of solution of ordinary differential equation to civil engineering problems by: a) Euler's method b) RungeKutta 4th order method	7
V	Application of Finite Difference Technique In Structural Mechanics: i. Introduction, expression of derivatives by finite difference: backward differences, forward differences and central differences. ii. Application of finite difference method for analysis of a) statically determinate beams, b) statically indeterminate beams Application of Finite difference technique in structural mechanics (Contd..) a) Buckling of columns, b) Beams on elastic foundation.	8

Course Outcomes

Course outcome	Descriptions
CO1	Students will acquire the knowledge of algorithms of numerical integration
CO2	Student will acquire skill of use of Ordinary Differential Equations
CO3	Student will acquire the skills of development of algorithms, finite difference techniques in structural mechanics.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Numerical Methods for Engineers-	Chapra S.C. &R.P.Canale	McGraw Hill, 1990.
2	Numerical methods in Engineering Problem	N.KrishnaRaju,K.U.Muthu	MacMillan Indian Limited, 1990: Galgotia, New Delhi,1997



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Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Numerical methods in Computer Programs in C”	Pallab Ghosh	Prentice Hall of India Private Limited, New Delhi, 2006.
2	Numerical methods for engineers using MATLAB and C	I Edition SCHILLING	“Thomson Publications”.
3	Numerical Recipes in Fortran 77 Art of scientific computing	William H Press	ISBN-13:978- 0521430647



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Remote Sensing and GIS

Subject Code: 18CE7PE43

L-T-P-C: 3-0-0-3

Course objectives:

Sl no	Description
1	Understand the basic concepts of remote sensing.
2	Analyze satellite imagery and extract the required units.
3	Extract the GIS data and prepare the thematic maps.
4	Use the thematic maps for various applications.

UNIT	Description	Hours
I	EMR and its interaction with atmosphere: Introduction to remote sensing, components of Remote sensing, electromagnetic radiation-sources, electromagnetic spectrum, types-active and passive, energy interaction in atmosphere-absorption, transmission and scattering, Energy interactions with earth's surface-spectral reflectance curves. Applications of remote sensing.	7
II	Platforms: Introduction, types of platforms-ground borne, air borne and space borne. Sensors, characters of sensors, types-active and passive. Sensors: Sensor parameters-spectral resolution, spatial resolution, thermal resolution and radiometric resolution. Satellites-types, Indian satellites.	7
III	Image Interpretation and Analysis: Introduction, basic elements of image interpretation and visual interpretation keys. Digital Image Processing: Introduction, stages involved in DIP- preprocessing, image enhancement, image transformations, image classification and analysis. Corrections-radiometric, geometric. Sources of errors in image processing.	9



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IV	Geographic Information System: Definition, basic components of a GIS, sub-systems of GIS, types and functions. Types of GIS data- attribute and spatial, data models-raster and vector. Maps in GIS and its types. Applications of GIS.	7
V	Data Management: Introduction to data base management systems-functions, components of DBMS, GIS Data File Management-simple list, ordered sequential files and indexed files. Building GIS Worlds-LCGU based GIS, layer based GIS, feature based GIS and object oriented GIS. Storage of GIS data- hybrid data model and integrated data model.	9

Course Outcomes:

Course outcome	Descriptions
CO1	Able to understand the concept of remote sensing and its applications.
CO2	Ability to know the importance of platforms and sensors.
CO3	To understand the concept of digital image processing and interpretation analysis.
CO4	Ability to know the components of GIS, applications and data management in GIS.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	“Remote sensing and image interpretation”, John Wiley and Sons, New york.	Thomas Lillesand, Kiefer and Chipman	7th Edition, 2015
2	“Remote Sensing and Geographical Information Systems”, B S Publications.	M Anji Reddy	Volume 1, 4th Edition, 2019



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Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	“Basics of Remote Sensing and GIS”, Laxmi Publications, New Delhi.	S Kumar	3 rd Edition, 2019
2	“Fundamentals of Remote sensing”, University press publishers, New Delhi	George Joseph and C Jeganathan	3 rd Edition, 2018
3	“Principles of Remote sensing”, International Geo-Information Science publishers	Wim H Bakker, Lucas L F and Colin V Reeves	4 th Edition, 2009
4	“Fundamentals of Geographical Information Systems”, John Wiley and Sons, New york.	Michael N Demers	4 th Edition, 2012



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: ENVIRONMENTAL ENGG. LABORATORY

Subject Code: 18CE705

L-T-P-C: 0-0-2-1

Course Objectives

Sl.No	Course Objectives
1	This course will enable students to learn different methods of water & waste water quality
2	This course will enable students, to conduct experiments to determine the concentrations of water and waste water
3	This course will enable students to understand the environmental significance and application in environmental engineering practice
4	This course will enable students to determine the degree and type of treatment

Sl. No.	Description	No of hrs
1	Determination of Solids in Sewage: Total Solids, Suspended Solids, Dissolved Solids, Volatile Solids, Fixed Solids, Settleable Solids	3
2	Determination of Chlorides and Sulphates	3
3	Determination of Alkalinity, Acidity and pH	3
4	Determination of Calcium, Magnesium and Total Hardness	3
5	Determination of Dissolved Oxygen. Determination of BOD	3
6	Determination of COD	3
7	Determination of percentage of available chlorine in bleaching powder, Residual Chlorine and Chlorine Demand	3
8	Jar Test for Optimum Dosage of Alum, Turbidity determination by Nephelometer	3
9	Determination of Iron. Phenanthroline method	3



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10	Determination of Fluorides SPANDS Method	3
11	MPN Determination	3
12	Determination Nitrates by spectrophotometer	3
13	Determination of sodium and potassium by flame photometer	3

Course Outcomes

Course outcome	Descriptions
CO1	Students will have skill to assess water quality parameters and compare it with standards
CO2	Students able to do assessment of wastewater quality and decide the treatment methods and its cost
CO3	Students able to evaluate the adverse effects of water quality and wastewater on humans and environment
CO4	The students can decide on treatment methods, its cost of treatment, performance study of existing treatment

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Standard methods, for the examination of water and wastewater 1985	BIS	16 th Edition, APHA, AWWA, WPCF
2	Environmental Pollution Analysis	SM Khopkar	New Age International Publishers



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Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Manual of Water and Wastewater Analysis NEERI Publication	BIS	
2	Standard Methods for Examination of Water and Wastewater (1995), American Publication Association, Water Pollution Control Federation, American Water Works Association, Washington DC		American Publications
3	IS Standards : 2490-1974, 3360-1974, 3307-1974. Chemistry for Environment Engineering. Sawyer and McCarthy	BIS	



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Internship

Subject Code: 18CE706

L-T-P-C: 0-0-2-1

Course Objectives

Sl. No	Course Objectives
1	To train the students to industrial practices relevant to civil engineering domain
2	To collect and interpret the data obtained in the field

Students will undergo internship training for a period of 21 days, pertaining to a specific aspect of civil engineering with well-defined limited scope and objectives. Students should undergo internship during their vacation at the end of VI semester, will visit an industry / construction site. During this process, they finalize the objectives and scope of work, under the guidance of a supervisor/ representative of the industry. They present the study in the form of a report under guidance of the faculty member during VII semester as a part of curriculum.

Course Outcomes

Course outcome	Descriptions
CO1	Able to identify and define the project for which training
CO2	To draw conclusions and suggest the suitable strategies related to internship



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Project Phase - I

Subject Code: 18CE7PW01

L-T-P-C: 0-0-4-2

Course Objectives

Sl. No	Description
1	To train the students to do literature survey in the preparation of synopsis.
2	To train the students to prepare synopsis report.

- ❖ The project batches shall be formed during the 7th semester. The students shall form the batches on their own (i.e., group of likeminded students) and shall approach a staff member for his / her consent to guide the project work.
- ❖ The number of students in a batch shall be normally being limited to maximum 4 and in exceptional cases; it may be minimum 2.
- ❖ A faculty member shall guide at least one project batch and shall not guide more than 3 batches.
- ❖ The students of the project batch shall prepare a synopsis of the intended project work and submit the same to the department.
- ❖ The internal evaluation shall be done by project evaluation committee of the department to scrutinize the synopsis submitted by the project batches through presentation.
- ❖ The committee shall give suggestions to improve the quality of work in the approval of the synopsis and students shall incorporate the changes if necessary.
- ❖ The project evaluation committee shall consist of the Head of the Department or his nominee as the Chairman, the guide and one faculty member identified by the Chairman. If any member is himself / herself the guide, another faculty member shall be co-opted, limiting the total number of the members of the committee to 3.



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Course Outcomes

Course outcome	Descriptions
CO1	Able to collect data by different methods and organize them.
CO2	Interpret the test data/ results, draw conclusions and suggest strategies as the case may be.



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering
Subject Name: Technical Seminar
Subject Code: 18CE7TS01

Semester: VII
L-T-P-C: 0-0-0-1

Course Objectives

Sl. No	Description
1	To enable the student to select relevant civil engineering topic for seminar presentation.
2	To train the student to compile a technical report and presentation material.
3	To enhance the technical and communication skills.

Description

- ❖ Each student shall give a technical seminar on a topic of civil engineering interest.
- ❖ Each student shall submit the title of the intended topic of seminar to the seminar evaluation committee of the department.
- ❖ The seminar evaluation committee shall scrutinize the titles submitted by the students and inform the students about the approval or suggestions to be incorporated to the title of the seminar.
- ❖ Each student shall submit the seminar report conforming to the standards and format prescribed by the department.
- ❖ The students shall give seminar on the topics approved by the seminar evaluation committee. The members of seminar evaluation committee shall be identified by HOD.

Course Outcomes

Course outcome	Descriptions
CO1	Appraise the current civil engineering research/ techniques / developments / interdisciplinary areas
CO2	Formulate seminar topic by utilizing technical resources/ Journals/ web sources & Carry out detailed review of available literature.
CO3	Compose technical report and defend the presentation.



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Course Outcomes:

The students will be able to:

1. Appraise the current civil engineering research/ techniques / developments / interdisciplinary areas.
2. Formulate seminar topic by utilizing technical resources/ Journals/ web sources.
3. Carry out detailed review of available literature.
4. Compose technical report.
5. Demonstrate command of voice modulation, voice projection, and pacing during presentation.

In this course, students will collect information on current issues being practiced in different fields of Civil Engineering like Structural Engineering, Water Resources, Geotechnical Engineering, Environmental Engineering, Transportation Engineering etc. by referring journals and other online sources leading to a comprehensive study of the topic selected. Students may also visit field for collection of data or any kind of validation the Syllabus chosen study topic requires. The evaluation will be carried out through presentation and viva-voce.

Identify a topic relevant to Civil Engineering on recent development/ case studies.

Carry out the literature review.

Compile data by direct and indirect methods.

Organize the data and prepare report.

Defend the presentation.

Course Objectives:

- To train the student to select relevant civil engineering topic for seminar presentation.
 - To train the student to develop multimedia presentation material.
 - To encourage the student to develop communication skills
-
- Each student is expected to give a technical seminar on a topic of civil engineering interest (topic other than topic of their project work).
 - Each student shall submit the title of the intended topic of seminar to the seminar evaluation committee of the department.
 - The seminar evaluation committee shall scrutinise those titles submitted by the students and shall inform the students about the approval or suggestions to be incorporated to the title of the seminar.
 - The dates and timings of the technical seminar shall be announced by the seminar evaluation committee.
 - Each student shall submit the seminar report conforming to the standards and format decided by the department.
 - The students shall give seminar on the topics approved by the seminar evaluation committee. The seminar evaluation committee shall consist of three members identified by HOD.

Civil Engineering Department



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Course Outcomes:

The students will be able to:

1. Appraise the current civil engineering research/ techniques / developments / interdisciplinary areas.
2. Formulate seminar topic by utilizing technical resources/ Journals/ web sources.
3. Carry out detailed review of available literature.
4. Compose technical report.

CO-2 Will collect data by direct and indirect methods and organize them.

CO-6 Interpret the test data/ results, draw conclusions and suggest strategies as the case may be.



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Internship

Subject Code: 18CE706

L-T-P-C: 0-0-2-1

Course Objectives

Sl.No	Course Objectives
1	To enable students to get exposed to insitu works and various software utilized in industrial practice.
2	To enable students to work in group with coordination among the team in a industry.
3	This course will enable in career development process and getting jobs in Government and private organizations.

Students will undergo internship training for a period of 21 days, pertaining to a specific aspect of civil engineering with well-defined limited scope and objectives. Majority of students during their vacation at the end of their VI semester, will visit an industry / construction site and will undergo internship at worksite. During this process, they finalize the objectives and scope of work, under the guidance of a supervisor/ representative of the industry. They present the study in the form of a report under guidance of the faculty member during their VII semester.



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VIII

Subject Name: DESIGN & DETAILING OF STRUCTURAL ELEMENTS

Subject Code: 18CE8PE11

L-T-P-C: 3-0-2-3

Course Objectives:

Sl.No	Course Objectives
1	To learn the design concepts of RCC and steel structures and preparation of the details of structural design.
2.	To provide exposure on drawing of staircase, column footing, lacing and battens and splicing of column.
3.	To understand the course design concepts of column, footing and portal frames.
4.	To learn the design of roof truss and welded plate girder.

Sl/No	PART – A Draw for given details	Hours
	Detailing of Structural Elements	18 Hrs(D)
1.	STAIRCASE: Dog legged	
2.	COLUMN AND FOOTING : Column footing (Square)	
3.	WELDED CONNECTIONS: Beam-beam, Beam-column: Seated, Stiffened and Un-stiffened.	
4.	COLUMN SPLICING: Column of same size and different sections. Lacing and battens. (Bolted connection only)	
	PART – B Design for given details	21Hrs (T)
	Design of Structural Elements	



1.	COMBINED FOOTING Design of Rectangular slab and beam type.	
2.	PORTAL FRAMES Design of Simple Portal Frames (Single bay & Single storey)	
3.	ROOF TRUSS Design of MS Roof Truss Joint (Forces in the members will be given) :Maximum members in a joint is 3.	
4.	PLATE GIRDER: Design of Welded plate girder	

Question paper Pattern

Descriptions	
Question paper should be set in such a manner that student should answer one complete question from PART A and PART B comprising of both RCC and Steel structures. In Part B Only a labeled line sketch is to be drawn.	
Part A-40 marks Drawing	Part B-60 Marks Design
1a) 20 marks for RCC drawing	3a) 30 marks for RCC design
b)20 marks for Steel drawing	b) 30 marks for Steel design
or	or
2a) 20 marks for RCC drawing	4a) 30 marks for RCC design
b) 20 marks for Steel drawing	b) 30 marks for Steel design



Course Outcomes

Course outcome	Descriptions
CO1	Students will be able to detail dog legged staircase column and footing for the given data.
CO2	Students will be able to detail welded connections for steel structures
CO3	Students will be able to Design Combined Footings and portal frames
CO4	Students will be able to Design Roof Truss and Plate girders.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1.	Reinforced Concrete Design	Unnikrishnan Pillai and Devdas Menon,	Mc Graw hill education India Pvt Limited 3 rd edition 2016
2.	Design of Concrete Structures	Subramanian. N	Oxford Higher Education 5 th Edition 2014
3.	Limit State Design of Steel Structures	S. K. Duggal,	Tata McGraw Hill Education Private Limited, New Delhi, India, II edition 2015
4.	Design of Steel Structures	N. Subramanian	Oxford University Press, New Delhi, India, 2016. Third Edition

Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Limit State Design of Reinforced Concrete	Arun KR jain, Ashok kumar jain and BC Punmia	Laxmi Publications, New Delhi revised edition 2016
2	IS 456:2000 and SP 16	Bureau of Indian Standards,	2000



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3	Design of Steel Structures	P. Dayarathnam	Prentice Hall India, New Delhi, India, 2016 III edition
4	IS800-2007, & Steel tables	Bureau of Indian Standards,	General Construction in Steel Code Practice 3 rd edition 2007



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VIII

Subject Name: Advanced Foundation Design

Subject Code: 18CE8PE12

L-T-P-C: 3-0-0-3

Course objectives:

Sl No	Description
1	Gain knowledge of geotechnical aspects in foundation design.
2	Develop profound understanding of shallow and deep foundation analysis.
3	Develop understanding of choice of foundation design parameters.
4	Learn about cause and effect of liquefaction on foundation.

UNIT	Description	Hours
I	Shallow Foundations: Principles of Design of foundation, Requirements for geotechnical and structural aspects of design, Proportioning of Isolated footing, Combined Footing, Strap footing, Strip footing and Raft foundation.	7
II	Pile Foundation: Historical Development, Necessity of pile foundations, Classification, Load carrying capacity of piles by Static formula in cohesive and cohesionless soils. Pile groups, group action of piles in sand and clay, group efficiency of piles and negative skin friction. Numerical problems on above. Introduction to micro piles.	9
III	Well Foundations: Introduction, Classification of well foundation, Components of well foundation. Forces acting on well foundation, Sinking of wells, Causes and remedies for tilts and shifts. Drilled Piers and Caissons-Construction, advantages and disadvantages of drilled piers. Design concepts and Advantages and disadvantages of open, pneumatic and floating caissons.	9



IV	Liquefaction of soils: Introduction, Phenomenon, factors affecting liquefaction, assessment of susceptible soil to liquefaction, measures for reducing the damage to structures due to liquefaction.	6
V	Foundations on Expansive Soils: Definition, Identification, Mineral Structure, Index properties of expansive soils, Swell potential and Swell pressure, Free swell Tests on expansive soils, foundation treatment for structures in expansive soil, CNS layer.	8

Course Outcomes:

Course outcome	Descriptions
CO1	Able to differentiate different types of foundations systems.
CO2	Able to design pile and well foundation including design.
CO3	To assess the soils susceptible to liquefaction and its effect on structures.
CO4	To enhance the knowledge of placing of foundations in expansive soils.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	“Pile Design, Construction And Practice”, Taylor And Francis Publications, New York.	Michael Tomlinson And John Woodward	5 th Edition, 2008
2	“Soil Mechanics And Foundation Engineering”, UBS Publishers And Distributors, New Delhi.	V N S Murthy	6 th Edition, 2009



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Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	“Theory And Practice Of Foundation Design”, Prentice Hall Of India, New Delhi.	N NSom And S C Das	3 rd Edition, 2009
2	“Soil Mechanics Fundamentals”, John Wiley And Sons Publications, New York.	Muni Budhu And Wiley Blackwell	1 st Edition, 2006
3	“Pile Foundations In Engineering”, Wiley Inter-Science Publications, New York.	ShamsherPrakash And Hari D Sharma	2 nd Edition, 2005
4	“Geotechnical Engineering”, New Age Publications, New Delhi	Venkatramaiah C	3 rd Edition, 2009



Syllabus for the Academic Year 2021 - 2022

Department: **Civil Engineering**

Semester: **VII**

Subject Name: **Solid Waste Management**

Subject Code: **18CE8PE13**

L-T-P-C: **3-0-0-3**

Course Objectives

Sl.No	Course Objective
1	Students will enable to know the classification and characterization
2	Students will know about the types of solid wastes, and its management through different methods of disposal

UNIT	Description	Hours
I	Introduction: Definition, Land Pollution scope and importance of solid waste management, functional elements of solid waste management. SOURCES: Classification and characteristics municipal, commercial & industrial. Methods of quantification. Collection And Transportation: Systems of collection, collection equipment, garbage chutes, transfer stations bailing and compacting, route optimization techniques and problems.	8
II	Treatment / Processing Techniques: Components separation, volume reduction, size reduction, chemical reduction and biological processing problems. Incineration: Process 3 T's, factors affecting incineration process, incinerators types, prevention of air pollution, pyrolysis, design criteria for incineration	8



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III	Composting: Aerobic and anaerobic composting, factors affecting composting, Indore and Bangalore processes, mechanical and semi mechanical composting processes. Vermicomposting. Sanitary Land Filling: Different types, trench area, Ramp and pit method, site selection, basic steps involved, cell design, prevention of site pollution, leachate & gas collection and control methods, geosynthetic fabrics in sanitary land fills	8
IV	Disposal Methods: Open dumping selection of site, ocean disposal, feeding to hogs, incineration, pyrolysis, composting, sanitary land filling, merits and demerits, biomedical wastes and disposal	8
V	Recycle and Reuse: Material and energy recovery operations, reuse in other industries, plastic wastes, environmental significance and reuse	7

Course Outcomes

Course outcome	Descriptions
CO1	The students should know about importance, scope, classification and characteristics of solid wastes.
CO2	To impart students the knowledge of collection, transportation, treatment techniques.
CO3	To educate students on various disposal methods, recycle and re use concepts of solid waste management.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Environmental Engineering	S.K. Garg	Vol II
2	Solid Waste Engineering	Vesilind.Pa Worrell &Reinhart.D	2009



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Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Integrated Solid Waste Management:	Tchobanoglous	McGraw Hill 1999
2	Solid Waste Management in developing countries	Bhide and Sunderashan	2000
3	Hand book on Solid Waste Disposal	Pavoni J.L	2008
4	Environmental Engineering	Peavy and Tchobanoglous	2012



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: BRIDGE ENGINEERING

Subject Code: 18CE8PE21

L-T-P-C: 3-0-0-3

Course Objectives:

Sl.No	Course Objectives
1.	To learn basic concepts of bridges.
2.	To learn about IS codal provisions in design of bridges.
3.	To understand the concept of design of culverts.
4.	To understand the design of RCC and PSC bridges.

UNIT	Description	Hours
I	Introduction: Classification of Bridges – Masonry, Arches RCC, Prestressed Concrete, Steel and composite bridges. Brief description of different types of bridges. Investigation of Bridge Site: Selection Sites — Selection of type of bridge, Hydrological and Geotechnical investigations.	8
II	Loads on Bridges: Introduction to different types of bridge loading (static, dynamic, seismic and IRC) on roads and bridges. Design of Pipe culvert for IRC class AA loadings.	8
III	Design of Box culvert for IRC class AA loadings. Design of SLAB culverts and slab bridges for IRC class AA loadings.	8
IV	Design of RCC slab bridges for IRC class AA loadings and design of interior panel of RCC bridges,	8



V	Introduction to segmental PSC Bridges Design of PSC slab bridges for IRC class AA loadings. Introduction to Bridge bearings – Types & functions of bearings – Loads on bearings	7
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Course Outcomes

Course outcome	Descriptions
CO1	Students will be made familiar about hydrological data regarding the bridge site.
CO2	Students will be made familiar about bridge sub structure and IRC loads, design and maintenance of bridges.
CO3	Students will be made familiar about components of bridge structure and design of RC bridge for IRC loads.
CO4	Students will be made familiar about design of PSC bridges and Bridge bearings.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Bridge Engineering	S.Ponnuswamy	McGraw Hill Book Company, III
2	Bridge Engineering	Johnson & Victor	Oxford & IBH Publishing Co New Delhi
3	Design of Bridges	Jayram&Jagadish	Tata McGraw-Hill



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Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Bridge Engineering	S.P.Bindra	DhanpatRai&SonsNew Delhi
2	Principles and Practice of Bridge Engineering	S.P.Bindra	DhanpatRai&SonsNew Delhi
3	IRC 6 ,18,21–2000	Standard Specifications and Code of Practice For Road Bridges	The Indian Road Congress New Delhi
4	Design of bridge	Dr. Krishna Raju	Oxford & IBH Publishing Co New Delhi



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Structural Dynamics

Subject Code: 18CE8PE22

L-T-P-C: 3-0-0-3

Course Objectives

Sl.No	Course Objectives
1	This course will enable students to understand the basic principle of structural dynamics.
2	to understand the behavior of structures subjected to dynamic loads
3	to understand the analytical and numerical methods in structural dynamics with emphasis on vibration
4	to evaluate the dynamic characteristics of the structures

UNIT	Description	Hours
I	Introduction: Introduction to structural dynamics, brief history of vibration, Basic definitions, vibration of SDOF (Single Degree of Freedom) systems, undamped, Damped, Free vibrations, equivalent viscous damping, Logarithmic decrement	8
II	Forced vibrations of SDOF system, Response of undamped and damped system subjected to harmonic loading, response to SDOF subject to harmonic base excitation, Duhamel's integral, response to general system of loading, dynamic load factor, response spectrum	8
III	Free vibration of MDOF (Multi Degree Freedom System), Natural frequencies, Normal modes, Orthogonality of normal modes, Eigen Values Shear buildings modeled as MDOF systems. Free vibrations, Natural frequencies	8
IV	Forced vibrations, Motion of shear buildings, Model Superposition Method, Response to shear buildings, Base motion, Harmonic fixed excitation. Damped motion of shear buildings, Equations for damped shear buildings, uncoupled damped equations, Conditions for damping uncoupled	8



V	Dynamic analysis of base stiffness matrices, Lumped mass and consistent mass formulation, Equations of motion	7
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Course Outcomes

Course outcome	Descriptions
CO1	Students will be able to analyse building to various dynamic loads: such as wind, earthquake, machine vibration and ambient vibration
CO2	to apply knowledge of mathematics, science, and engineering by developing the equations of motion for vibratory systems and solving for the free and forced response
CO3	to Interpret dynamic analysis results for designing the suitable structural element,
CO4	to apply structural dynamics theory to earthquake analysis.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Vibrations, structural dynamics	M. Mukhopadhaya	Oxford IBH
2	Structural Dynamics	Mario Paz	CBS publishers

Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Structural Dynamics	Anil Chopra	PHI Publishers
2	Structural Dynamics	Clough & Penzen	TMH



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VIII

Subject Name: Urban Transport Planning

Subject Code: 18CE8PE23

L-T-P-C: 3-0-0-3

Course Objectives :

Sl.No	Course Objectives
1	Basics of Urban Transportation
2	Survey of urban transportation and trip generation
3	Trip distribution and assignment
4	Urban Transport Planning For Small And Medium Cities

UNIT	Description	Hours
I	Introduction: Scope of Urban transport planning Inter dependency of land use and traffic System Approach to urban planning. Stages In Urban Transport Planning: Trip generation Trip production - Trip distribution Modal split Trip assignment.	8
II	Urban Transport Survey - Definition of study area-Zoning-Types of Surveys Inventory of transportation facilities Expansion of data from sample. TRIP GENERATION: Trip purpose Factors governing trip generation and attraction Category analysis Problems on above	8
III	TRIP DISTRIBUTION: Methods Growth factors methods Synthetic methods Fractor and Furness method and problems on the above. MODAL SPLIT: Factors affecting characteristics of split Model split in urban transport planning problems on above	8
IV	TRIP ASSIGNMENT: Assignment Techniques Traffic fore casting Land use transport models Lowry Model Garin Lowry model Applications in India (No problems on the above)	8
V	Urban Transport Planning For Small And Medium Cities: Introduction Difficulties in transport planning Recent Case Studies.	7



Course Outcomes

Course outcome	Descriptions
CO1	Students will gain the knowledge about the scope of urban transport planning land usage, trip generation, production and distribution.
CO2	Students will be able to do urban transport survey in which they understand types of survey inventory of transportation facilities and expansion of data from sample.
CO3	Students will gain knowledge about trip generation distribution and assignments.
CO4	They will learn to make urban transport planning for small and medium cities.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Traffic Engineering and Transport Planning	L.R. Kadiyali	Khanna Publishers.
2	Principles of urban transport system planning	B.G. Hutchinson	Scripta Book Co., Washington D.C. & McGraw Hill Book Co.

Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Urban Transport planning	Black John - Croom	Helm ltd, London.
2	Introduction to transportation engineering	Jotin Kristey and Kentlal	PHI, New Delhi.
3	Urban and Regional models in geography and planning-	Hutchison B G	John Wiley and sons London.
4	Entropy in urban and regional modeling	Wilson A G	Pion ltd, London.



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Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VIII

Subject Name: Pavement design

Subject Code: 18CE8PE31

L-T-P-C: 3-0-0-3

Course objectives :

Sl no	Course objectives
1	To enable the students learn the basics of pavements,differences between highway and airfield pavements
2	to design flexible and rigid pavements
3	to understand about maintenance and evaluation of flexible and rigid pavements.

UNIT	Description	Hours
I	Introduction: Desirable characteristics of pavement, types and components,comparison between Rigid and flexible pavement Difference between Highway pavement and Air field pavement with respect to loading characteristics. . Fundamentals of Design of Pavements: Design life, Traffic factors, climatic factors, Road geometry, etc., Boussinesq's theory principle, Assumptions Limitations and problems on above - Burmister theory,assumptions, limitations and problems on above.	08
II	Design Factors: Design wheel load, contact pressure, ESWL concept Determination of ESWL by equivalent deflection criteria Stress criteria EWL concept. Flexible Pavement Design: Assumptions McLeod Method Kansas method Tri-axial method - CSA Method using IRC 37-2001,CR-method of pavement design, problems on above.	10



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III	<p>Stresses in Rigid Pavement: Principle Factors-wheel load and its repetitions, properties of plain cement concrete. External conditions joints Reinforcement Analysis of stresses Assumptions Westergaard's Analysis Modified Westergaard's equations Critical stresses Wheel load stresses, Warping stress Frictional stress combined stresses - problems on above.</p>	07
IV	<p>Design of Rigid Pavement: Design of C.C. Pavement by IRC: 58 2001 Requirements of joints, Types of joints: Expansion joint, contraction joint, warping joint, construction joint, longitudinal joint. Design of joints, Design of Dowel bars, Design of Tie bars and problems on above</p>	07
V	<p>Flexible pavement failures, maintenance and evaluation: Types of failures, causes, remedial/maintenance measures in flexible pavements, Functional Evaluation by visual inspection and unevenness measurement by using different techniques - Structural Evaluation by Benkelman Beam Deflection Method.</p> <p>Rigid Pavement Failures, Maintenance And Evaluation: Types of failures, causes, remedial/maintenance measures in rigid pavements Functional Evaluation by visual inspection and unevenness measurements.</p>	07

Course Outcomes

Course outcome	Descriptions
CO1	Student understands the desirable characteristics of pavements, its types, functions of various layer and fundamentals of design of pavements.
CO2	The student learn various pavement design factors, stresses in flexible pavements and their design methods.
CO3	Students able to learn about various types of stresses in rigid pavements and its determination, stresses in reinforcement.
CO4	Students able to learn about the design of rigid pavements, joints, dowel bars and tie bars and maintenance of flexible and rigid pavements.



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Highway Engineering	Khanna,CEC Justo and Veeraraghavan	Nemchand& Bros
2	Principle and practice of Highway Engineering	L.R.Kadiyalli and N.B.Lal	Khanna publications

Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Principles, practice and design of Highway Engineering	S.k.Sharma	S.Chand Technical publications
2	Principles of Pavement Design	Yoder and Witzack	2nd edition, John Wileys and Sons
3	Relevant IRC codes		



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Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VIII

Subject Name: Finite Element Analysis

Subject Code: 18CE8PE32

L-T-P-C: 3-0-0-3

Course objectives:

Sl no	Course objectives
1	Develop analytical skills.
2	Learn principles of analysis of stress and strain.
3	Develop problem solving skills.
4	Understand the principles of FEM for one and two dimensional problems.



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UNIT	Description	Hours
I	Introduction to FEA and FEM, Theory of elasticity concepts, Energy principles, Rayleigh - Ritz Method, Galerkin method and finite element method, steps in finite element analysis, displacement approach, stiffness matrix and boundary conditions.	8
II	Discretisation; finite representation of infinite bodies and discretisation of very large bodies, Natural Coordinates, Shape functions; polynomial, Lagrange and Serendipity , one dimensional formulations; beam and truss with numerical examples.	7
III	2D formulations; Constant Strain Triangle, Linear Strain Triangle, 4 and 8- noded quadrilateral elements, Numerical Evaluation of Element Stiffness - Computation of Stresses, Static Condensation of nodes, degradation technique, Axisymmetric Element.	8
IV	Iso-parametric concepts; is opera metric, sub parametric and super parametric elements, Jacobian transformation matrix, Stiffness Matrix of Iso-parametric Elements, Numerical integration by Gaussian quadrature rule for one, two and three dimensional problems.	8
V	Techniques to solve non-linearities in structural systems; material, geometric and combined non linearity, incremental and iterative techniques. Structure of computer program for FEM analysis, description of different modules, exposure to FEM soft wares.	8

Course Outcomes

Course outcome	Descriptions
CO1	Understand the concepts behind formulation methods in FEM.
CO2	Identify the application and characteristics of FEA elements such as bars, beams.
CO3	Develop element characteristic equation and generation of global equation.
CO4	Able to apply suitable boundary conditions to a global equation for bars and trusses, beams problems and solve them displacements, stress and strains induced.



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Finite Element analysis	Krishnamoorthy C.S.,	Second Edition & 1994
2	Introduction to Finite element Method	Desai C & Abel J F	East West Press Pvt. Ltd& 2006

Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	A first course on Finite element Method	Daryl L Logan,	Fourth edition
2	Finite Element Procedures in Engineering analysis	Bathe K J	Second Edition
3	Concepts and applications of Finite Element analysis	Cook R D et.al.	Fourth Edition



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Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VII

Subject Name: Air Pollution & Control

Subject Code: 18CE8PE33

L-T-P-C: 3-0-0-3

Course Objectives

Sl.No	Course Objectives
1	This course will enable students to Study the sources and effects of air pollution
2	This course will enable students to Learn the meteorological factors influencing air pollution.
3	This course will enable students to Analyze air pollutant dispersion models
4	This course will enable students to Illustrate particular and gaseous pollution control methods.

UNIT	Description	Hours
I	Introduction: Definition Classification and Characterization of Air Pollutants, Emission Sources, Behavior and Fate of air Pollutants, Chemical Reactions in the Atmosphere, Photo-chemical Smog, Coal-induced smog, Air Pollution Inventories	8
II	Effects of Air Pollution: On Human Health, Animals, Plants and Materials Major Environmental Air Pollution Episodes London Smog, Los Angeles Smog & Bhopal Gas Tragedy. Meteorology: Introduction Meteorological Variables, Primary and Secondary pollutants Lapse Rate, Inversions, Stability Conditions, Windrose, General Characteristics of Stack Plumes, Meteorological Models	8



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III	<p>Factors to be considered in Industrial Plant Location and Planning Noise pollution sources, measurement UNITS, effects and control</p> <p>Sampling, Analysis and Control: Sampling and Measurement of Gaseous and Particulate matter, Stack Sampling, Analysis of Air Pollutants, Smoke and Smoke Measurement, Air Pollution Control Methods Particulate, Emission Control, Gravitational Settling Chambers, Cyclone Separators, Fabric Filters, Electrostatic Precipitators, Wet Scrubbers, Selection of a Particulate Collecting Equipment, Control of Gaseous Emissions, Adsorption by Liquids, Absorption by Solids, Combustion odours and their control</p>	8
IV	<p>Air Pollution Due To Automobiles: Air Pollution due to Gasoline Driven and Diesel Driven Engines, Effects, Direct and Indirect Methods of control</p>	7
V	<p>Burning Environmental Issues:</p> <ol style="list-style-type: none"> 1. Acid Rain 2. Global Warming 3. Ozone Depletion in Stratosphere 4. Indoor Air Pollution <p>ENVIRONMENTAL LEGISLATION: Environmental Policy, Environmental Acts, Water, Air and Noise Pollution Standards</p>	8

Course Outcomes

Course outcome	Descriptions
CO1	Ability to classify air pollutants and air pollution inventories
CO2	Understand the effects of air pollution on human health, animals and plants
CO3	Able to understand noise pollution sources, measurements, effects and control
CO4	Able to understand acid rain, global warming, ozone depletion and air & noise pollution standards



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Environmental Engineering	P. VenugopalaRao	2002
2	Fundamentals of Air Pollution	B.S.N. Raju	2000

Reference Book:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Air Pollution	Bouhel, R.W., Donald, L.F., Turner, D.B., and Stern, A.C	Academic Press
2	Air Pollution Control Theory	Crawford, M	TMH Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
3	Environmental Engineering	Peavy, H.S., Rowe, D.R., and Tchobanoglous, G	McGraw Hill Book Co. 2013



Syllabus for the Academic Year 2021 - 2022

Department: Civil Engineering

Semester: VIII

Subject Name: Project work phase II

Subject Code: 18CE8PW02

L-T-P-C: 0-0-14-7

Course Objectives

Sl. No.	Course Objectives
1.	To impart skills to work in teams
2.	To apply the acquired theoretical knowledge for solving practical problems.
3.	To develop report preparation and presentation skills.

Description

- ❖ The continuation of main Project Work will be done after the synopsis approval by the Departmental Evaluation Committee.
- ❖ After the synopsis approval LABORATORY INVESTIGATIONS will be carried out and data will be compiled suitably.
- ❖ Organize the data and prepare report.
- ❖ Defend the presentation.
- ❖ The end term practical examination for the project work will be assessed by internal and external examiners.

Course Outcomes

Course outcome	Descriptions
CO1	Team spirit is cultivated and leadership qualities are acquired
CO2	Analyzing the result and concluding remarks are carried out.
CO3	Able to analyze, design and implement solutions for practical problems.



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