SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
---------CIVIL ENGINEERING----------

Semester/Year	V/III	Program	B.Tech
Subject Category: DC	Subject Code: CE-501	Subject Name:	Advance Surveying

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	-	2	4

Prerequisites:

Surveying

Course Objective:

1. To understand the basics and elements of different types of curves on roads and their preliminary survey
2. To learn about surveying applications in setting out of curves, buildings, culverts and tunnels
3. To get introduced to different geodetic methods of survey such as triangulation, trigonometric levelling
4. To learn about errors in measurements and their adjustments in a traverse
5. To get introduced to modern advanced surveying techniques involved such as Remote sensing, Total station, GPS, Photogrammetry etc.

Course Outcomes:

After completion of the course, the student will be able to:

1. set out curves, buildings, culverts and tunnels
2. carry out a geodetic survey, taking accurate measurements using instruments and adjusting the traverse apply mathematical adjustment of accidental errors involved in surveying measurements
3. plan a survey for applications such as road alignment and height of the building
4. invoke advanced surveying techniques over conventional methods in the field of civil engineering

UNITs	Descriptions	Hrs.	CO's
I	Modern equipment's for surveying: Digital levels and theodolites, Electronic Distance measurement(EDM), Total Station and Global Positioning Systems (GPS), Digital Planimeter .	7	CO1
II	Surveying Astronomy: Definitions of astronomical terms, coordinate systems for locating heavenly bodies, geographic, geodetic, geocentric, Cartesian, local and projected coordinates for earth resources mapping, convergence of meridian, parallel of latitude, shortest distance between two points on the earth, determination of latitude and longitude.	9	CO1
III	GPS Surveying: Introduction & components of GPS, Space segment, control segment and user segment, Elements of Satellite based surveys-Map datums, GPS receivers, GPS observation methods and their advantages over conventional methods. Digital Terrain Model (DTM): Topographic representation of the terrain and generation of DTM on computers using spot heights and contour maps.	8	CO2

IV	Photogrammetry: Principle, definitions and classifications of terrestrial and aerial photogrammetry, flight planning for aerial photography, scale and relief displacements of vertical aerial photographs, stereoscopic vision on vertical photographs, computation of position, length and elevations of objects using photographs and photo mosaic.	9	CO3
V	Remote Sensing: Principle, components, classification, remote sensing data acquisition process, different types of remote sensing satellite imagery with special relevance to Indian Remote Sensing Satellites (IRS) and applications. Geographic Information Systems (GIS): Definition, components and advantages.	7	CO4
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. Measurement of horizontal angle by repitation.
2. Determination of constants by tachometer.
3. Measurement of horizontal distance by stadia tachometry.
4. To setting curves by linear method.
5. To setting simple circular curve by Rankine method tangential angle.
6. Plotting a closed traverse in field by using theodolite.
7. Plotting of a open traverse in field by using theodolite.
8. Practising of modern equipment's.
9. Determination of horizontal and vertical distance by total station.
10. Determination of traversing and area calculation by total station.

Text Book-

1. Surveying and Leveling-Part-I & II by T.P. Kanetkar and S.V. Kulkarini, Pune Vidyarthi Griha Prakashan, Pune
2. Engineering Surveying: Theory and Examination Problems for Students by W. Schofield, Butterworth, Heinemann, Oxford.

Reference Books-

1. Surveying: Problems Solving with theory and objective type questions by A.M. Chandra, New Age International Publishers N. Delhi.
3. Advance Surveying by A.M. Chandra, New Age International Publishers N. Delhi.
4. Surveying Vol. II by S.K. Duggal, Tata McGraw Hill Publishing Company Ltd. New Delhi.
5. Remote Sensing and image interpretation by Lillesand T.M. and Kiefer R.W.

Modes of Evaluation and Rubric

Quiz, Assignment, Mid term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

https://swayam.gov.in/nd1_noc20_ce51/preview
https://nptel.ac.in/courses/105107121

Recommendation by Board of studies on	13-06-2024
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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---------CIVIL ENGINEERING----------

Semester/Year		V/III	Program		B.Tech
Subject Category	DC	Subject Code:	CE-502	Subject Name:	Fluid Mechanics - II

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	-	2	4

Prerequisites:

Fluid Mechanics - I

Course Objective:

Students are expected to learn various types of flows in open channel and also to design open channel sections in a most economical fashion with minimum wetted perimeter and learn about critical flows, non-uniform flows in open channel and longitudinal slopes in open channel and also to learn about the characteristics of hydraulic jump, fluid flow patterns and learns to use boundary layer theory and drag forces etc.

Course Outcomes:

After completion of the course, the student will be able to:

1. Visualize fluid flow phenomena observed in Civil Engineering systems such as flow through pipes, analysis of pipe distribution system.
2. Analyse fluid flows in open channel hydraulics and other devices such as weirs and flumes.
3. Design open channels for most economical sections like rectangular, trapezoidal and circular sections
4. Analyse the effect of drag & lift forces due to fluid.
5. Design and analyse the different hydraulic machine-like turbines, pumps etc.

UNITs	Descriptions	Hrs.	CO's
I	Turbulent flow: Laminar and turbulent boundary layers and laminar sub layer, hydro-dynamically smooth and rough boundaries, velocity distribution in turbulent flow, resistance of smooth and artificially roughened pipes, commercial pipes, aging of pipes. Pipe flow problems: Losses due to sudden expansion and contraction, losses in pipe, losses due to fittings, concepts of equivalent length, hydraulic and energy gradient lines, siphon, pipes in series, pipes in parallel, branching of pipes, Three Reservoir problems. Pipe Network: Water Hammer, Transmission of power. Hardy Cross Method.	9	CO1
II	Uniform flow in open channels: Channel geometry and elements of channel section, velocity distribution, energy in open channel flow, specific energy, types of flow, critical flow and its computations, uniform flow and its computations, Chezy's and Manning's formulae, determination of normal depth and velocity, Normal and critical slopes, Economical sections of different channel. Saint Venanet equation.	9	CO2
III	Non uniform flow in open channels: Basic assumptions and dynamic equations of gradually varied flow, characteristics analysis and computations of flow profiles, rapidly varied flow- hydraulic jump in rectangular channels and its basic characteristics, surges in open channels & channel flow routing, venturi flume.	7	CO3

IV	Forces on immersed bodies: Types of drag, drag on a sphere, a flat plate, a cylinder and on an aerofoil development of lift, lifting vanes, Magnus effect.	8	CO4
V	Fluid Machines: Turbines: Classifications, definitions, similarity laws, specific speed and unit quantities, various types of turbines and their classifications, Peloton turbine-their construction and settings, speed regulation, dimensions of various elements, Action of jet, torque, power and efficiency for ideal case, characteristic curves. Reaction turbines: construction & settings, draft tube theory, runaway speed, simple theory of design and characteristic curves, cavitation. Pumps: Centrifugal pumps: Various types and their important components, mano metric head, total head, net positive suction head, specific speed, shut off head, energy losses, cavitation, principle of working and characteristic curves. Reciprocating pumps: Principle of working, Coefficient of discharge, slip, single acting and double acting pump, Mano metric head, Acceleration head.	7	CO5
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. Determination of friction factor
2. Study the performances characteristics of Pelton Wheel
3. Study the performances characteristics of Francis Turbine
4. Study the performances characteristics of Kaplan Turbine
5. Calibration of multistage (Two) Pump & Study of characteristic of variable speed pump
6. To study the performance & details of operation of Hydraulic Ram (Water Hammer effect)
7. Determination of coefficient of discharge for a broad crested weir & to plot water surface profile over weir
8. Study of the characteristic of the Reciprocating pump
9. Study of Hydraulic Jump.
10. Study of surges in open channel flow.

Text Book-

1. Fluid Mechanics - Modi& Seth - Standard Book house, Delhi
2. Open Channel Flow by Rangaraju- Tata McGraw - Hill Publishing Comp. Ltd., New Delhi
3. Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4. Fluid Mechanics, Hydraulics & Hydraulic Machanics - K.R. Arora - Standard Publishers Distributors 1705- B, NaiSarak, Delhi-6

Reference Books-

1. Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)
2. Open Channel Hyd. By Chow V.T. (McGraw Hill, New York).
3. Engineering Hydraulics By H. Rouse
4. Centrifugal & Axial Flow Pump ByStempanoff A.J. New York
5. Dr. D.S. Kumar, Fluid Mechanics and Fluid Power Engineering.

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

https://swayam.gov.in/nd1_noc20_ce59/preview
https://nptel.ac.in/courses/103102211

Recommendation by Board of studies on	13-06-2024
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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---------CIVIL ENGINEERING----------

Semester/Year		V/III	Program		B.Tech
Subject Category	DC	Subject Code:	CE-503	Subject Name:	Structural Design & Drawing – I (R.C.C.)

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	-	2	4

Prerequisites:

Mechanics of material

Course Objective:

Student is expected to learn basic fundamentals of reinforced concrete design & provision of IS 456-2000 code of practice for the design of concrete structure, the stress strain behaviour of steel and concrete, basic concepts of working stress and limit state methods, knowledge of limit state design for flexure, shear, torsion, bond and anchorage, behaviour of columns subjected to direct and eccentric load and use of interaction diagrams, design of staircases and various types of foundations along with the application of all the above to provide economic solution for the real life problems of Civil Engineering.

Course Outcomes:

After completion of the course, the student will be able to:

1. Design various reinforced concrete elements by working stress and limit state method.
2. Interpret the appropriate relevant industry design codes related to structure design.
3. Familiar with professional and contemporary issues in the design and construction of reinforced concrete members

UNITs	Descriptions	Hrs.	CO's
I	Basic Principles of Structural Design: Assumptions, Mechanism of load transfer, Various properties of concrete and reinforcing steel, Introduction to working stress method and various limit state methods of design-Collapse, Serviceability and durability, partial safety factor for load and material. Calculation of various loads for structural design including wind and earthquake loads, Partial load factors. Analysis of singly and doubly reinforced sections	9	CO1
II	Design of Beams: Rectangular & Flanged Beams, Lintel, Cantilever, simply supported and continuous beams, beams with compression reinforcement, Redistribution of moments in continuous beams, Circular girders, Deep beams, Design of Beam for strength and serviceability with provision for the bond, anchorage, development length and splicing.	8	CO1
III	Design of Slabs: Slabs spanning in one direction. Cantilever, simply supported and Continuous slabs, Slabs spanning in two directions, Introduction to Circular slabs, Waffle slabs, Flat slabs, Yield line theory.	7	CO1
IV	Columns & Footings: Effective length of columns, short and long columns-Square, Rectangular and Circular columns, Isolated and combined footings, Strap footing, Columns subjected to axial loads and bending moments (sections with no tension), Annular footings, Design of short and slender columns subjected to – axial loads, uniaxial and biaxial bending.	9	CO2

V	Staircases: Staircases with waist slab having equal and unequal flights with different support conditions, Slab less tread-riser staircase for various support condition as per the codal provisions. NOTE: - All the designs for strength and serviceability should strictly be as per the latest version of IS:456. Use of SP-16 (Design aids)	7	CO3
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. Design & drawing of simply supported beam.
2. Design & drawing of cantilever beam.
3. Design & drawing of continuous beam.
4. Design & drawing of simply supported one way slab.
5. Design & drawing of two-way slab.
6. Design & drawing of one-way continuous slab.
7. Design & drawing of circular slab.
8. Design & drawing of rectangular column.
9. Design & drawing of circular column.
10. Design & drawing of rectangular footing.
11. Design & drawing of staircase (waist slab type)
12. Design & drawing of staircase (tread-riser type)

Text Book-

1. Reinforced concrete design - Pillai Menon, Tata McGraw Hills
2. Limit State Design by P.C.Varghese ; Prentice Hall of India, New Delhi
3. Design of Reinforced Concrete Elements by Purushothaman; Tata McGraw Hill, New Delhi
4. Reinforced Cement Concrete by Gupta &Mallick, Oxford and IBH

Reference Books-

1. Reinforced Cement Concrete by P. Dayaratnam, Oxford and IBH
2. Plain & Reinforced Concrete Vol. I– O.P. Jain & Jay Krishna
3. Plain & reinforced concrete – B.C. Punmia.

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

https://nptel.ac.in/courses/105/105/105105162/
https://nptel.ac.in/courses/105/106/105106112/
https://nptel.ac.in/courses/105/105/105105105/

Recommendation by Board of studies on	13-06-2024
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Compiled and designed by	
Subject handled by department	Civil Engineering

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---------CIVIL ENGINEERING----------

Semester/Year		V/III	Program		B.Tech
Subject Category	DC	Subject Code:	CE-504	Subject Name:	Structural Analysis-I

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	-	-	3

Prerequisites:

Mechanics of material

Course Objective:

Students are expected to learn
1. To calculate loads for structural analysis.
2. To identify determinate, indeterminate, stable and unstable structures.
3. To determine forces and deflections in determinate trusses, beams and frames.
4. To determine force & moments in indeterminate beams and small frame structures.
5. Study of two and three hinged arches and suspension cable, Analysis of determinate structure for moving loads.

Course Outcomes:

1. To outline the equilibrium of structure.
2. To identify suitable method to solve a given problem.
3. To analyze the results obtained by solving the given problem of arches & suspension cable, determinate and indeterminate structures.
4. Analysis of determinate & indeterminate structures for rolling load & influence lines.

UNITs	Descriptions	Hrs.	CO's
I	Types of structures, Different type of loading and supports, Static and Kinematic Indeterminacy, strain energy and complementary energy, Principle of virtual work, Displacements of Beams, Trusses by unit load method, Displacement due to lack of fit, temperature variation, support movements. Method of Consistent Deformation for Beams, Frames and Trusses up to two degrees of indeterminacy, Energy theorems, Maxwell's Reciprocal theorem, Analysis of beams, Pin-Jointed and rigid frames for static loads.	8	CO1
II	Fixed and Continuous Beams: Beams fixed at ends, Beams of varying Cross-Section, Partially Fixed at Ends. Effect of Settlement of Supports, Three Moment Theorem for continuous Beams, Beams of Uniform and varying Cross-Sections. Effect of Settlement of Supports.	9	CO1
III	Indeterminate Structures - II: Analysis of beams and frames by slope Deflection method, Moment Distribution Method (without sway)	7	CO2
IV	Arches and Suspension Cables: Three hinged arches of different shapes, Eddy's Theorem, Suspension cable, stiffening girders, Two Hinged and Fixed Arches - Rib shortening and temperature effects	9	CO3
V	Rolling loads and Influence Lines: Maximum SF and BM curves for various types of rolling loads, focal length, EUDL, Influence Lines for Determinate Structures- Beams, Three Hinged Arches and trusses	7	CO4
Guest Lectures (if any)			
Total Hours		40	

Text Book-

1. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
2. Norris C.H., Wilbur J.B. and Utkys, Elementary Structural Analysis, McGraw Hill International, Tokyo.
3. Theory Of Structure by Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain

Reference Books-

1. R.C. Hibbler, Structural Analysis – Pearson (Prentice Hall)
2. Wang C.K., Intermediate structural analysis, McGraw Hill, New York.
3. Kinney Sterling J., Indeterminate structural Analysis, Addison Wesley.
4. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
5. Norris C.H., Wilbur J.B. and Utkys, Elementary Structural Analysis, McGraw Hill International, Tokyo.
6. Theory Of Structure by Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam and End term exam.
Rubric: End term exam.

List/Links of e-learning resource

https://swayam.gov.in/nd1_noc20_ce35/preview
https://nptel.ac.in/courses/105101085
https://nptel.ac.in/courses/105105166

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Subject handled by department	Civil Engineering

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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---------CIVIL ENGINEERING----------

Semester/Year		V/III	Program		B.Tech
Subject Category	DE-I (A)	Subject Code:	DE-505 DE-I (A)	Subject Name:	Transportation Engineering - II

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	-	-	3

Prerequisites:

Basic knowledge about the road traffic, different pavement roads and highways.

Course Objective:

1. To understand the importance of various transportation system and characteristics of road transport.
2. To know about the history of road and highway development, surveys and classification of roads.
3. To study about design of various geometric components of highways.
4. To study about road traffic characteristics and design of intersections and signal.
5. To know about the type of pavement, materials and pavement design.

Course Outcomes:

After completion of the course, the student will be able to:

1. Understanding the concept of Highway planning alignment, Geometric design and design of flexible and rigid pavement and material used for pavement.
2. Acquire the knowledge of highway constructions techniques and its maintenance and also understand the concepts of traffic engineering and planning.
3. Identify the knowledge of planning a runway, taxiway of airport and their geometrical elements.

UNITs	Descriptions	Hrs.	CO's
I	**Highway planning, Alignment & Geometric Design**: Principles of highway planning, road planning in India and financing of roads, classification patterns. Highway alignment and survey. **Cross sectional elements**- width, camber, super-elevation, sight distances, extra widening at curves, horizontal and vertical curves, and numerical problems.	8	CO1
II	**Pavement material and design: Design** of flexible and Rigid pavements using IRC Codes, desirable properties and test of highway materials, design of mixes and stability, WBM, WMM, BM, BC, surface dressing, interfacial treatment- seal coat, tack coat, prime coat, wearing coats, grouted macadam Advantages and disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints, dowel bars, tie bars.	8	CO1
III	**Highway maintenance:** Surface and sub-surface drainage of highway, pavement failure, types of flexible and rigid pavement failure, pavement performance evaluation and maintenance, strengthening and overlay design: Benkelman beam and Dynamic Cone Penetration Test (DCPT).	6	CO2
IV	**Traffic Engineering and Planning:** Traffic characteristics - Traffic studies-speed, capacity, volume, speed and delay, peak hour factor, origin destination, parking and accident. Statistical analysis of traffic data: microscopic and macroscopic parameters of traffic flow. Traffic operations regulation and control; design of intersections- at grade and grade separated. Signal design by Webster's method. Principles of	8	CO2

	planning, inventories, trip generation, trip distribution, model split, traffic assignment, plan preparation.		
V	**Airport Planning and Design:** Airport site selection, aircraft characteristic and their effects on runway alignments, taxi ways and runways, pattern of runway capacity. Windrose diagrams, basic runway length and corrections, classification of airports. Zoning regulations, approach area, approach surface-imaginary, conical, horizontal. Rotating beacon, boundary lights, approach lights, runway and taxiway lighting etc.	10	CO3
Guest Lectures (if any)			
Total Hours		40	

Text Book-

1. Highway Engineering by Gurucharan Singh
2. Principles of Pavement Design by E.J. Yoder & M.W. Witzech
3. Highway Engineering by O'Fleherty
4. Highway Engineering by S.K. Khanna& C.E.G. Justo
5. Airport Planning & Design by S.K. Khanna& M. G. arora
6. Foresch, Charles "Airport Planning"
7. Horonjeff Robert "The Planning & Design of Airports"

Reference Books-

1. Sharma & Sharma, Principles and Practice of Highway Engg.
2. Haung, Analysis and Design of Pavements
3. Relevant IRC & IS codes
4. Laboratory Manual by Dr. S.K. Khanna
5. Highway Engg. By Hews & Oglesby
6. Highway Material by Walker

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam and End term exam
Rubric: End term exam.

List/Links of e-learning resource

https://nptel.ac.in/courses/105/101/105101087/
https://nptel.ac.in/courses/105/101/105101008/
https://nptel.ac.in/courses/105/104/105104098/

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---------CIVIL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech
Subject Category	OE-I (A)	Subject Code:	OE-506 OE-I (A)	Subject Name:	Cost Effective & Eco-Friendly Structures

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical		Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work		L	T	P	
60	20	10	10	-	-	100	3	-	-	3

Prerequisites:

1. Understand the Definition, Concept & Objectives of the terms cost effective & Eco-Friendly construction

1. Apply cost effective techniques in construction
2. State the importance of cost-effective construction & evaluate the objectives of green buildings.
3. Explain how Pre-Engineered Construction can be cost effective & select alternative Construction System.
4. Know the concept of Integrated Life cycle design of Materials and Structures

Course Objective:

1. Understand the Definition, Concept & Objectives of the terms cost effective & Eco-Friendly construction
2. Apply cost effective techniques in construction
3. State the importance of cost-effective construction & evaluate the objectives of green buildings.
4. Explain how Pre-Engineered Construction can be cost effective & select alternative Construction System.
5. Know the concept of Integrated Life cycle design of Materials and Structures

Course Outcomes:

On completion of the course, the students will be able to

1. State the importance of cost-effective construction.
2. Identify Environmental Issues
3. Know the application of Ferro cement & Ferro concrete Structures
4. How Pre-Engineered Construction can be cost effective
5. Compare Initial Cost of Cost Effective & Eco-Friendly Construction V/s Conventional Construction

UNITs	Descriptions	Hrs.	CO's
I	**Concepts of energy efficient & environment friendly materials and techniques.** **Cost effective materials: -** Soil, Fly ash, Ferrocement, Lime, Fibres, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer. **Energy Efficient & Environment friendly building material products: -**Basic concepts of Energy efficient buildings, Walls - Stabilised and sun dried, soil blocks & bricks, Solid & Hollow concrete blocks, stone	8	CO1

	masonry blocks, Ferrocement partitions. Roofs - Precast R.C. Plank & Joists roof, Precast channel roof, Precast L-panel roof, Precast Funicular shells, Ferrocement shells, Filler Slab, Seasal Fibre roof, Improved country tiles, Thatch roof, M.C.R. tile, Pavelled Blocks		
II	**Cost effective construction techniques and equipment's: -** (a) Techniques: - Rat trap bond construction, Energy Efficient roofing's, Ferrocement technique, Mud Technology. (b) Equipment's: - Brick moulding machine, Stabilised soil block making machine and plants for the manufacturing of concrete blocks, M.C.R. tile making machine, Ferrocement wall panel & Roofing channel making machine, R.C.C. Chaukhat making m/c.	9	CO2
III	**Cost effective sanitation: -** (a) Waste water disposal system (b) Cost effective sanitation for rural and urban areas (c) Ferrocement Drains	8	CO3
IV	**Low-Cost Road Construction: -** Cost effective road materials, stabilization, construction techniques tests, equipment used for construction, drainage, maintenance.	8	CO4
V	**Cost analysis and comparison: -** (a) All experimental materials (b) All experimental techniques	7	CO5
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

Text Book-

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkatta Rama Reddy & K S Nanjunda Rao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – By AskoSarja – SPON Press

Reference Books-

1. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers
2. Buildings How to Reduce Cost – Laurie Backer - Cost Ford

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

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

https://nptel.ac.in/courses/127/101/127101014/

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---------CIVIL ENGINEERING----------

Semester/Year		V/III		Program		B.Tech
Subject Category	OE-I (B)	Subject Code:	OE-506 OE-I (B)	Subject Name:		Road Safety Engineering

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	-	-	3

Prerequisites:

Basic knowledge on Road safety Engineering.

Course Objective:

To provide the basic knowledge on road safety engineering and acquaint them with evaluation of safety hazardous locations and remedial road safety measures.

Course Outcomes:

After the completion of the course the student should be able to

1.Able to acquire knowledge methods and application of road safety engineering and accident analysis.

2.Able to remember the process of road safety audit and the measures of improving road safety.

3. Able to Qualified to evaluate the effectiveness of various management techniques adopted in reducing road accidents

UNITs	Descriptions	Hrs.	CO's
I	Introduction to Road safety: Road accidents, Trends, causes, Collision diagrams; Highway safety; Human factors and road user limitations; Speed and its effect on road safety; Vehicle factors, Road safety improvement strategies; Elements of a road safety plan.	9	CO1
II	Understanding and Analysis of road accident Data: Before-after methods in accident analysis, Recording of accident data; Accident Investigation and Analysis; Statistical testing and the role of chance; Black Spot Identification and Investigations, Case Studies.	8	CO1
III	Road Safety Audits: Key elements of a road safety audit, Road Safety Audits & Investigations, Work zone safety audit; Crash investigation and analysis, Methods for identifying hazardous road locations, Case Studies.	7	CO2
IV	Road Accident Reconstruction: Describe the basic information that can be obtained from the roadway surface, Understand basic physics related to accident reconstruction, speed for various skid, friction, drag, and acceleration scenarios, variables involved in jump and flip crashes, variables involved in pedestrian crashes, Case Studies.	8	CO2
V	Remedial safety Measures: Accident prevention by better planning, Accident prevention by better design of roads, Accident remedial measures, Highway operation and	8	CO3

	accident control measures, Highway Safety Measures during construction, Highway geometry and safety; Safety in urban areas; Public transport and safety; Road safety policy making, Stakeholders involvement; Road safety law.		
Guest Lectures (if any)			
Total Hours		40	

Text Book-

5. C. Jotin Kishty& B. Kent Lall, Transportation Engineering-An Introduction, Thrid Edition, Prentice Hall of India Private Limited, New Delhi, 2006
6. Khanna and Justo, Text book of Highway Engineering, Nemchand Brothers, Roorkee.
7. GeetamTiwari and Dinesh Mohan, Transport Planning and Traffic Safety: Making Cities, Roads, and Vehicles Safer, CRC Press, 2016.B.C. Punmia; Building Construction.
8. nstitute of Transportation Engineers (ITE), The Traffic Safety Toolbox: A Primer on Traffic Safety, ITE, 1999.
9.

Reference Books-

10. J. Stannard Baker, Traffic Collision Investigation, Northwestern University Center for Public Safety, 2002.
11. Ezra Hauer, Observational Before-After Studies in Road Safety, Pergamon Press, 1997 (reprinted 2002).
12. AthelstanPopkess, Traffic Control and Road Accident Prevention, Chapman and Hall, 1997 (Digitized 2008)

Modes of Evaluation and Rubric

Quiz, Assignment, Midterm exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

https://nptel.ac.in/courses/105/105/105105215/

Recommendation by Board of studies on	13-06-2024
Approval by Academic council on	
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Subject handled by department	Civil Engineering Department