PADMASHREE KRUTARTHA ACHARYA INSTITUTE OF ENGINEERING & TECHNOLOGY, BARGARH

LESSON PLAN

Session-2023-2024

Discipline: Civil Engineering Engg. Semester: 4th

Subject: Structural Design-I

Name of the Teaching Faculty: Bimamaditya Bagh

Subject: Structural Design-I No. of Days/per week class allotted : 05

Semester From Date :16-01-2024 To Date :26-04-2024 No. of Weeks : 15

Week	Class Day	Theory /Practical Topics
1	1st	Working stress Method Objective of design and detailing. State the different methods of design of concrete structures
	2nd	Introduction to reinforced concrete. R.C. sections their behaviours, grades of concrete and steel. Permissible stresses assumption in W.S.M.
	3rd	Flexural design and analysis of singly reinforced sections from basic principles
	4th	Concept of under reinforced, over reinforced sections and balanced section.
	5th	Advantages and disadvantages of WSM, reason for its obsolescene
2	1st	philosophy of limit state method Definition. Advantages of LSM over WSM, IS code suggestions regarding design philosophy
	2nd	Types of limit states, partial safety factors for material strength characteristics strength, Characteristic load, design loads, loading on structure as per IS. 875
	3rd	Study of I.S. specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam, column & footing minimum reinforcement in slab, beam & column, lapping, anchorage effective span for beam & slab
	4th	Analysis and Design of singly and double reinforced section (LSM) Limit state of collapse (Flexure), Assumptions
	5th	Stress-strain relationship for concrete and steel, neutral axis
3	1st	Stress block diagram and strain diagram for singly reinforced section
	2nd	Concept of under reinforced, over-reinforced

Bikramaditya Bagh
Signature of the Faculty

Subject: Structural Design-I No. of Days/per week class allotted : 05

Semester From Date :16-01-2024 To Date :26-04-2024 No. of Weeks : 15

Week	Class Day	Theory /Practical Topics
	3rd	limiting section, neutral axis co-efficient
	4th	limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section
	5th	Analysis and design: determination of design constants
4	1st	determination of design constants
	2nd	moment of resistance
	3rd	area of steel for rectangular section
	4th	area of steel for rectangular section
	5th	Necessity of doubly reinforced sections
5	1st	design of doubly reinforced rectangular section
	2nd	design of doubly reinforced rectangular section
	3rd	design of doubly reinforced rectangular section
	4th	shear, Bond and Development Length (LSM) Nominal, shear stress in R.C. section, design shear strength of concrete maximum shear stress, design of shear reinforcement minimum shear reinforcement, forms of shear reinforcement

Bikramaditya Bagh
Signature of the Faculty

Subject: Structural Design-I No. of Days/per week class allotted : 05

Semester From Date :16-01-2024 To Date :26-04-2024 No. of Weeks : 15

Week	Class Day	Theory /Practical Topics
	5th	Bond and types of bond, bond stresses, checks for bond stress development length in tension and compression, anchorage value for hooks 90° bend and 45° bend standard lapping of bars
6	1st	check for development length, Numerical problems on deciding whether shear reinforcement is required for not, check for adequacy of the section in shear
	2nd	Design of shear reinforcement, Minimum shear reinforcement in beams
	3rd	Analysis and Design of T-beam (LSM) General features
	4th	Advantages of T-beam
	5th	effective width of flange as per IS: 456-2000 code provisions
7	1st	Analysis of singly reinforced T-beam
	2nd	Analysis of singly reinforced T-beam
	3rd	stress & strain diagram
	4th	depth of neutral axis
	5th	depth of neutral axis
8	1st	Moment of resistance of T-beam sections with neutral axis lying within the flange

Bikramaditya Bagh
Signature of the Faculty

Subject: Structural Design-I No. of Days/per week class allotted : 05

Semester From Date :16-01-2024 To Date :26-04-2024 No. of Weeks : 15

Week	Class Day	Theory /Practical Topics
	2nd	moment of resistance of T- beam section with neutral axis lying within the flange
	3rd	Simple numeric problem on deciding effective flange width
	4th	simple numeric problem on deciding effective flange width
	5th	problems only on binding moment of resistance of T- beam section when N.A. lies within flange
9	1st	problems only on binding moment of resistance of T- beam section when N.A. lies upto the bottom of flange small
	2nd	problems on binding moment of resistance of T- beam section when N.A lies upto the bottom of flange
	3rd	Analysis and Design of slab and staircase (LSM) Design of simply supported one way slabs for flexure check for deflection control and shear
	4th	Design of simply supported one-way slabs for flexure check for deflection control and shear
	5th	Design of simply supported one way slabs for flexure check for deflection control and shear
10	1st	Design of one-way cantilever slabs
	2nd	Design of one-way cantilever slabs
	3rd	Design of one-way cantilever chhajja for flexure check for deflection control and check for development length and shear

Bikramaditya Bagh
Signature of the Faculty

Subject: Structural Design-I No. of Days/per week class allotted : 05

Semester From Date :16-01-2024 To Date :26-04-2024 No. of Weeks : 15

Week	Class Day	Theory /Practical Topics
	4th	Design of two-way simply supported slabs for flexure with corner free to lift
	5th	Design of two-way simply supported slabs for flexure with corner free to lift
11	1st	Design of two way simply supported slabs for flexure with corner free to lift
	2nd	Design of dog-legged staircase
	3rd	Design of dog-legged staircase
	4th	Design of dog legged staircase
	5th	Detailing of reinforcement in stairs spanning longitudinally
12	1st	Detailing of reinforcement in stairs spanning longitudinally
	2nd	Detailing of reinforcement in stairs spanning longitudinally
	3rd	Design of Axially loaded column and footing (LSM) Assumptions in limit state of collapse-compression
	4th	Assumptions in limit state of collapse - compression
	5th	Definition and classification of columns

Bikramaditya Bagh
Signature of the Faculty

Subject: Structural Design-1 No. of Days/per week class allotted : 05

Semester From Date :16-01-2024 To Date :26-04-2024 No. of Weeks : 15

Week	Class Day	Theory /Practical Topics
13	1st	effective length of column, specification for minimum reinforcement
	2nd	cover, maximum reinforcement
	3rd	number of bars in rectangular, square and circular sections
	4th	diameter and spacing of lateral ties
	5th	diameter and spacing of lateral ties
14	1st	Analysis and design of axially loaded short square column
	2nd	Analysis and design of axially loaded short square column
	3rd	Analysis and design of axially loaded rectangular column
	4th	Analysis and design of axially loaded rectangular column
	5th	Analysis and design of axially loaded short circular column
15	1st	Analysis and design of axially loaded circular column
	2nd	Types of bonding

Biknamaditya Bagh
Signature of the Faculty

Subject: Structural Design-I No. of Days/per week class allotted : 05

Semester From Date :16-01-2024 To Date :26-04-2024 No. of Weeks : 15

Week	Class Day	Theory /Practical Topics
	2nd	Design of isolated square column footing of uniform thickness for flexure and shear
	4th	design of isolated square column footing of uniform thickness, for flexure and shear
	5th	design of isolated square column footing of uniform thickness for flexure and shear

Bikramaditya Bagh
Signature of the Faculty