

PADMASHREE KRUTARTHA ACHARYA INSTITUTE OF ENGINEERING & TECHNOLOGY, BARGARH



PROGRESS REGISTER

Session-2022-2023

Discipline: Civil Engg.

Semester: 4th

Subject: Structural Design-I

Name of the Teaching Faculty: Bikramaditya Bagh

Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
15/02/2023	Working stress method Objective of design & detailing State the different methods of design of concrete structure	Objective of design & detailing detailing Different methods of design of concrete structures	Stability, strength, serviceability, Working stress method, Limit state collapse, Serviceability, Ultimate load method	<u>Bd Bash</u>
16/02/2023	Introduction to reinforced concrete, R.C. section their behaviour, grades of concrete and steel. Permissible stresses assumption in WSM	Introduction to reinforced concrete, grade of concrete grade of steel, permissible stress.	definition of reinforced concrete, various types of grade & steel discuss Bond bar plan, permissible stress of different grade of concrete	<u>Bd Bash</u>
17/02/2023	Flexural design & analysis of singly reinforced section from first principles	Flexural design & analysis of singly reinforced section from first principles	define modular ratio modulus of elasticity of concrete derivation of formula for balanced design	<u>Bd Bash</u>
20/02/2023	concept of under-reinforced over reinforced and balanced sections	concept of under-reinforced over reinforced and balanced section	detail description how to know the section is under-reinforced, balanced section	<u>Bd Bash</u>
22/02/2023	Advantages and disadvantages of WSM, reason for its obsolescence	Advantages and disadvantages of WSM, reason for its obsolescence	Various points discuss working stress method advantages & disadvantages, Doubly Reinforced beam	<u>Bd Bash</u>
23/02/2023	Philosophy of limit state method. Definition, Advantages of LSM over WSM, IS code suggestion regarding design philosophy	philosophy of limit state method, Definition, Advantages of LSM over WSM, IS code suggestion regarding design philosophy	introduction to LS method limit state collapse concrete Deflection & cracking characteristic load, strength material	<u>Bd Bash</u>
24/02/2023	Types of limit states, partial safety factor for material strength characteristic strength characteristic load, design loads, loading on structures as per IS 875	Types of limit states, partial safety factor for material strength characteristic strength, load design loads, loading on structures as per IS 875	partial safety factor Design values, limit state of collapse: flexure assumption, characteristic strength, load stress-strain curve for concrete	<u>Bd Bash</u>
25/02/2023	Study of IS specification regarding spacing of reinforcement in slab, beam, column & footing. minimum reinforcement for slab, beam & column, lapping.	study of IS specification regarding spacing reinforcement in slab, column & footing. minimum reinforcement in slab, beam, column & lapping	minimum dia. of reinforcement and clear cover in slab, beam, column, lapping. Derive singly reinforced section	<u>Bd Bash</u>
27/02/2023	Analysis & design of single & double reinforced section (LSM) Limit state of collapse (flexure) Assumptions	analysis & design of single & double reinforced section (LSM) limit state of collapse (flexure) Assumption	Derivation single & double reinforced section (LSM) ratio of neutral axis to effective depth Limiting moment of resistance	<u>Bd Bash</u>
01/03/2023	stress-strain relationship for concrete and steel. Neutral axis	stress-strain relationship for concrete and steel, Neutral axis	detail description of stress-strain relationship concrete and steel definition of neutral axis	<u>Bd Bash</u>
02/03/2023	stress block diagram and strain diagram for singly reinforced section	stress block diagram and strain diagram for singly reinforced section	detail drawing description of stress & strain diagram for singly reinforced section	<u>Bd Bash</u>

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

Semester From Date : 14/02/2023 To Date : 10/06/2023 No. of Weeks : 15

Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
03/03/2023	concept of under-reinforced over-reinforced	concept of under-reinforced over-reinforced	section choosing by neutral axis and effective depth ratio, section is under or over-reinforced	<u>BdBeah</u>
04/03/2023	limiting section, neutral axis coefficient	limiting section, neutral axis coefficient	limiting section, moment of resistance, neutral axis coefficient, deflection	<u>BdBeah</u>
06/03/2023	limiting value of moment of resistance and limiting % of steel required for limiting singly R.C. section	limiting % of reinforcement, limiting moment of resistance of singly reinforced section	limiting value from tabulation of different equation, moment % of steel reinforcement	<u>BdBeah</u>
09/03/2023	Analysis & design: determination of design constant	determination of design constant, neutral axis lever arm, % of steel	limiting value of different constant formulae	<u>BdBeah</u>
10/03/2023	determination of design constants	determination of design constants	design constant determine	<u>BdBeah</u>
11/03/2023	moment of resistance	moment of resistance	determine limiting different moment of resistance	<u>BdBeah</u>
13/03/2023	area of steel for rectangular section	area of steel for rectangular section	limiting % of steel in rectangular beam	<u>BdBeah</u>
15/03/2023	area of steel for rectangular section	area of steel for rectangular section	numerical problem on % of steel in beam section	<u>BdBeah</u>
16/03/2023	Necessity of doubly reinforced section	Necessity of doubly reinforced section	various point discuss about necessity of doubly reinforced section	<u>BdBeah</u>
17/03/2023	design of doubly reinforced rectangular section	design & derive of doubly reinforced rectangular section	derive formulae of moment of resistance and area of steel	<u>BdBeah</u>
18/03/2023	design of doubly reinforced rectangular section	stress strain diagram of doubly reinforced section	detail description diagram of stress strain in doubly reinforced section	<u>BdBeah</u>

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20/03/2023	design of doubly reinforced rectangular section	calculate moment of resistance in numeric problem	bursting factor of moment, steel % for compression & tension zone, numeric problem	<u>BdBasik</u>
22/03/2023	Shear, Bond & Development Length (L _{dv}) Nominal, shear stress in R.C. section, design shear resistance of concrete, maximum shear stress, design of shear reinforcement, minimum shear, bond of shear	shear in structural members, diagonal tension & compression, design of shear, bond, shear,	Types of shear diagram, tension & compression, design of shear reinforcement, vertical, inclined, Bar up bar	<u>BdBasik</u>
23/03/2023	Bond and types of bond, bond stress, checks for bond stress, development length in tension & compression, anchorage value, bar hooks, 90° bend and 45° bend, standard lapping of bars	Bond types, design of bond, checks for development length, 90° and 45°	debare bond & development length, Design bond stress values, numeric problem on development length	<u>BdBasik</u>
24/03/2023	check bar development length. Numerical problems on deciding whether shear reinforcement is required or not check bar adequacy of the section in shear	check bar development length. Numerical problem on deciding whether shear reinforcement is required or not check bar adequacy of section in shear	numeric problem on shear, Bond, development length, checking inclined and vertical stirrups	<u>BdBasik</u>
25/03/2023	design of shear reinforcement, minimum shear reinforcement in beams	design of shear reinforcement, minimum shear reinforcement in beam	numeric problem on design of shear reinforcement, minimum shear reinforcement	<u>BdBasik</u>
27/03/2023	Analysis and design of T-beam (L _{dm}) General features	Analysis & design of T-beam beams	Introduction of flange, rib, width, effective depth of T-beam, total compression & tension	<u>BdBasik</u>
29/03/2023	Advantages of T-beam	advantage of T-beam	various point discussion in T-beam advantage	<u>BdBasik</u>
31/03/2023	effective width of flange as per IS: 456-2000 code provision	effective flange width as per IS: 456-2000 code provision	as per IS code width of effective flange, neutral axis condition under-reinforced section or balance	<u>BdBasik</u>
03/04/2023	Analysis of singly reinforced T-beam	analysis of singly reinforced T-beam	determine of single reinforced T-beam, N.A. lies in flange or web	<u>BdBasik</u>
05/04/2023	strain & stress diagram Analysis of singly reinforced T-beam	strain & stress diagram, analysis of singly reinforced T-beam	detail description of strain & stress diagram, analysis of singly reinforced T-beam	<u>BdBasik</u>
06/04/2023	strain & stress diagram	strain & stress diagram	finding neutral axis depth of stress & stress diagram	<u>BdBasik</u>

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08/04/2023	depth of neutral axis	depth of neutral axis lies flange	derive moment of resistance for neutral axis depth	Bd Bash
10/04/2023	depth of neutral axis	depth of neutral axis lies web	derive formulae of moment of resistance and neutral axis depth	Bd Bash
11/04/2023	moment of resistance of T-beam sections with neutral axis lying within the flange	moment of resistance of T-beam section with neutral axis lying within the flange	numeric problems on bending moment of resistance in T-beam neutral axis lies in flange	Bd Bash
12/04/2023	moment of resistance of T-beam section with neutral axis lying within the flange	moment of resistance of T-beam section with neutral axis lying within the flange	numeric problem on bending moment of resistance in T-beam neutral axis lies within the flange	Bd Bash
13/04/2023	simple numerical problems on deciding effective flange width	simple numerical problem on deciding flange width	numeric problem on deciding flange width	Bd Bash
15/04/2023	simple numerical problem on deciding effective flange width	simple numeric problem on deciding effective flange width	simple numeric problems on deciding effective flange width	Bd Bash
	problems only on binding moment of resistance of T-beam section when N.A. lies within flange	problem only on binding moment of resistance of T-beam section when N.A. lies within flange	only on binding moment of resistance of T-beam section N.A. lies within flange problem	Bd Bash
	problems only on binding moment of resistance of T-beam section when N.A. lies within flange	problem only on binding moment of resistance of T-beam section when N.A. lies within flange	numeric problem only on moment of resistance when N.A. lies within flange	Bd Bash
	problems only on binding moment of resistance of T-beam section when N.A. lies within flange	problem only on binding moment of resistance of T-beam section when N.A. lies within flange	problem solving on N.A. lies within flange to find moment of resistance	Bd Bash
17/04/2023	Analysis & design of slab and stairs case (L&T) Design of simply supported one-way slabs for flexure, check for deflection control and shear	design of simply supported one-way slabs for flexure, check for deflection control and shear	Introduction, type of spanning slab, derive one-way slab moment and shear, design flexure, check for shear, crack	Bd Bash
19/04/2023	Design of simply supported one-way slabs for flexure, check for deflection control and shear	design of simply supported one-way slabs for flexure, check for deflection control and shear	solving numeric problem one-way simply supported slab, check for deflection control and shear, check for cracking	Bd Bash

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To Date : 10/06/2023

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Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
20/04/2023	Design of simply supported one-way slabs bar flexure, check bar deflection control and shear	design of simply supported one-way slabs bar flexure, check bar deflection control and shear	sketch, supplementary details, bearing slab on masonry wall	<u>BdBagh</u>
21/04/2023	Design of one-way cantilever slabs	design of one-way cantilever slab	introduction, Analysis, Estimate load, moment steel, check bar development length	<u>BdBagh</u>
24/04/2023	Design of one-way cantilever slabs	design of one-way cantilever slabs	check bar shear, check bar deflection, check bar cracking, supplementary details	<u>BdBagh</u>
26/04/2023	Design of one-way cantilever chhajja bar flexure, check bar deflection control and check bar development length and shear	design of one-way cantilever chhajja bar flexure, check bar deflection control and check bar development length and shear	simple numeric problem on design of one-way cantilever slabs	<u>BdBagh</u>
27/04/2023	Design of two-way simply supported slabs bar flexure with corner free to lift	design of two-way simply supported slabs bar flexure with corner free to lift	comparison one-way & two-way slab, moment of strip of unit width spanning lx and ly, Bending moment coefficient	<u>BdBagh</u>
28/04/2023	Design of two-way simply supported slabs bar flexure with corner free to lift	design of two-way simply supported slabs bar flexure with corner to lift	Load on beam, load carried by beam, check bar development length, check bar shear	<u>BdBagh</u>
29/04/2023	Design of two-way simply supported slabs bar flexure with corner free to lift	design of two-way simply supported slabs bar flexure with corner free to lift	check bar deflection, check bar cracking, sketch, numeric problem on two-way simply supported slab	<u>BdBagh</u>
31/05/2023	Design of dog-legged staircase	stair slabs, classification of stairs	components of staircase, Tread, Rise, waist slab, straight, dog-legged, open well	<u>BdBagh</u>
02/05/2023	Design of dog-legged staircase	design of dog-legged staircase	numeric problem on dog-legged stairs, check bar shear, check bar development length	<u>BdBagh</u>
04/05/2023	Design of dog-legged staircase	design of dog-legged staircase	check bar deflection, design of flight, check bar shear arrangement	<u>BdBagh</u>
06/05/2023	Detailing of reinforcement in stairs spanning longitudinally	detailing of reinforcement in stairs spanning longitudinally	check bar development length, check bar deflection, check bar cracking, sketch	<u>BdBagh</u>

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Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
08/05/2023	detailing of reinforcement in stairs spanning longitudinally	detailing of reinforcement in stairs spanning longitudinally	numeric problem on dog-legged staircase	<u>BdBagh</u>
10/05/2023	detailing of reinforcement in stairs spanning longitudinally	detailing of reinforcement in stairs spanning longitudinally	reinforcement use details in staircase in spanning longitudinally	<u>BdBagh</u>
11/05/2023	Design of axially loaded column and footing (LSM) Assumptions in limit state of collapse-compression	column & footing assumption in limit state of collapse-compression	definition column & footing, column assumptions	<u>BdBagh</u>
12/05/2023	Assumption in limit state of collapse-compression	assumption in limit state of collapse-compression	Various point to be discussed on limit state collapse-compr assumption	<u>BdBagh</u>
13/05/2023	Definition and classification of column	definition and classification of column	Braced, unbraced sway and un-sway Tied & spiral column	<u>BdBagh</u>
15/05/2023	Effective length of column, specification for minimum reinforcement	effective length of column specification for minimum reinforcement	definition effective length of column, check for minimum eccentricity	<u>BdBagh</u>
17/05/2023	cover, maximum reinforcement	cover, maximum reinforcement	clear cover provided in column and number of column & dia use in column	<u>BdBagh</u>
24/05/2023	number of bars in rectangular, square and circular sections	number of bars in longitudinal in rectangular, square and circular section	Longitudinal reinforcement use in column % of steel minimum and maximum Transverse reinforcement	<u>BdBagh</u>
26/05/2023	diameter and spacing of lateral ties	diameter and spacing of lateral ties	pitch, diameter use in lateral of column arrangement of transverse reinforcement	<u>BdBagh</u>
27/05/2023	diameter and spacing of lateral ties	diameter and spacing of lateral ties	helical reinforcement dia, of bar use in column, cover of column	<u>BdBagh</u>
29/05/2023	Analysis and design of axially loaded short square column	short square column	design of short square column in numeric problem design	<u>BdBagh</u>

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Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
31/05/2023	Analysis and design of axially loaded short square column	short square column	design and solving problem on axially loaded short square column	<u>BdBagh</u>
01/06/2023	Analysis and design of axially loaded rectangular column	rectangular column	design and solving problem on axially loaded rectangular column	<u>BdBagh</u>
02/06/2023	Analysis and design of axially loaded rectangular column	rectangular column	design and solving problem on axially loaded rectangular column	<u>BdBagh</u>
03/06/2023	analysis and design of axially loaded short circular column	circular column	design and solving of circular column use lateral ties	<u>BdBagh</u>
05/06/2023	analysis and design of axially loaded circular column	circular column	design and solving of circular column use helical reinforcement	<u>BdBagh</u>
07/06/2023	Types of footing	Types of footing	Introduction footing continuously, isolated, combined, raft footing, strap, pile foundation, strap footing	<u>BdBagh</u>
08/06/2023	Design of isolated square column footing of uniform thickness base flexure and shear	design of isolated square column footing of uniform thickness base flexure and shear	numeric problem on isolated square column footing	<u>BdBagh</u>
09/06/2023	Design of isolated square column footing of uniform thickness base flexure and shear	design of isolated square column footing	size footing, check shear, check base development length, check base cracking	<u>BdBagh</u>
10/06/2023	Design of isolated square column footing of uniform thickness base flexure and shear	design of R.C.C. isolated square column footing	size of footing, Net upward pressure, moment, check development length, two way shear, spacing bar steel	<u>BdBagh</u>