

M.Sc. STRUCTURAL ENGINEERING

REINFORCED CONCRETE DESIGN

TOPICS TO BE COVERED:

- Basic concepts of flexural design.
- Codes, standards and specifications.
- Gravity and lateral loads.

- Preliminary analysis and proportioning of framed structures.
- Load combinations.
- Pattern loading.
- Moment and shear envelopes.
- Bond, development length and bar-cutoffs.
- Revision of axially loaded columns and uniaxial bending cases of columns.
- Biaxial bending:
 - Method to plot interaction surface.
 - Approximate methods of design.

- Slender columns, moment magnification method for sway and braced columns.
- Introduction to torsion.
- Difference between equilibrium and compatibility torsion.
- Elastic and plastic shear stress distribution for different shapes of cross-sections.
- Soap film analogy, sand heap analogy, and shear flow.
- General pattern of cracking due to torsion and bending plus torsion.

- Design for torsion by space truss analogy.
- Yield line theory for analysis of slabs.
- Direct design method for two-way slab systems.

Design for flexure.

Design for shear.

- Equivalent frame method of design for two-way slab systems.
- Moment-curvature relationships.
- Load-displacement relationships.
- Moment redistribution.

- Introduction to section, member, and structure ductility.
- Strip method for slab design.
- Design of reinforcement at joints.
- Detailing for seismic resistance.
- Design of raft foundations.

BOOKS:

- Building code requirements for reinforced concrete, ACI-2005.

- Notes on ACI, Portland Cement Association, latest.
- Reinforced concrete – a fundamental approach, 5th Edition, Nawy.
- Design of concrete structures, Nilson and others.
- Reinforced concrete structures, Park and Paulay.
- Reinforced concrete – mechanics and design, MacGregor.
- Reinforced concrete design, Ferguson, SI edition.
- Reinforced concrete design, C. K. Wang.
- UBC 1997 or ASCE-7 report.

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