

Design of Masonry Structures

01ST1112 (PEC)

Objective of the Course:

- To impart knowledge about the masonry design approaches.
- To study the analysis and design of masonry structures.
- To check the stability of masonry walls.

Credit Earned: 3
Students learning outcomes:

After successful completion of the course, it is expected that student will be able to,

1. Understand the types of masonry elements and mechanical properties of masonry.
2. Design the masonry and reinforced masonry structural elements
3. Determine shear strength and ductility of Reinforced Masonry members
4. Apply the codal provisions for seismic resistance and strengthening of masonry structures.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	CS E (I)	IA (M)	Viva (V)	Term Work (TW)	
03	00	00	03	50	20	30	25	25	150

Detailed Syllabus

Sr. No.	Title of the unit	Number of hours
1	Introduction	10
	Historical background, Materials for masonry, Material properties, Failure in masonry, Loading, Masonry in shear/flexure/compression, Masonry wall configuration, Masonry under lateral load, in plane and out of plane failure.	
2	Masonry Components	16
	Structural and non-structural masonry, Lintel, unreinforced structural masonry, Reinforced brick masonry, Reinforced components with	

Structural Engineering

	opening, Prestressed masonry, Stability of walls, Coupling of masonry walls, Openings, Columns and Beams.	
3	Analysis and Design of Masonry Structures	16
	Estimation of load and load combinations, Analysis and design of masonry and reinforced masonry members, Working and ultimate strength design, Lateral load distribution in flexible and rigid diaphragm, infill walls, cyclic load, Capacity design spectra, Codal provisions for seismic resistance, Strengthening of existing masonry structures.	
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Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	5%	20%	25%	25%	20%

Instructional Method and Pedagogy:

1. Use of Learning Management system like canvas
2. Demonstration through presentations on power point and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

Recommended Study Material:
Reference Book:

1. Hendry A. W, Sinha B. P. and Davies S. R, "Design of Masonry Structures".
2. Hamid Ahmad A. and Drysdale Robert G., "Masonry Structures: Behavior and Design"
3. Jagdish K. S, "Structural Masonry", IK International
4. Brzev Svetlana, "Earthquake Resistant Confined Masonry Construction", NICEE
5. IS Codes: IS:1905, IS: 4326, IS:13828, IS:1893, IS: 13935