

GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL (WATER RESOURCES ENGINEERING) (33) REHABILITATION AND RETROFITTING OF BUILDINGS SUBJECT CODE: 2723308

SEMESTER: II

Type of course: Structural engineering

Prerequisite: Fundamental knowledge of concrete technology, design of reinforced concrete structure, design of steel structure.

Rationale: to study the failure process of concrete structures, measurement and strengthening of structures.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
ESE	OEP	PA			RP					
3	2#	2	5	70	30	20	10	10	10	150

Content:

Sr.No	Topics	Teaching Hrs.	Module Weightage
1.	Durability of concrete: Factors affecting durability of concrete, Corrosion of reinforcements in concrete, Carbonation, Chloride ingress, Alkali-silica reaction, Freeze-thaw effects, Chemical attack, Abrasion, erosion and cavitation, Weathering and efflorescence	8	20
2	Defects and deterioration in buildings, Survey and assessment of structural conditions in RCC structures, Masonry buildings and Steel structures	8	20
3	Non-destructive testing of concrete quality, Non-destructive testing of connections in steel, Corrosion assessment in reinforcements in RCC elements and components in steel structures	8	20
4	Materials for repairs, rehabilitation and retrofitting processes, Methods for repairs, rehabilitation and retrofitting including surface preparation, Study of failures of buildings and lesson learnt, Role of quality control in construction as Preventive measures Maintenance of buildings, Strengthening of Earthquake-damaged buildings, Introduction to Push-over analysis	18	40

Reference Books :

1. Concrete Microstructures, properties and materials - P Kumar Mehta and Paulo J. M. Monterio
2. Properties of concrete - A. M. Neville
3. Materials for construction - Lai, James, S.
4. Structural condition assessment - Robert T. Ratay
5. Handbook of retrofitting earthquake damaged buildings

Course Outcome:

After learning the course the students should be able to: Students will be able to understand durability of concrete, destructive testing of concrete, retrofitting process and method of repairs.

List of Experiments:

Based on Syllabus

Open Ended Projects: case studies

Major Equipments: UTM,CTM

List of Open Source Software/learning website: STAAD,STRAP

http://en.wikipedia.org/wiki/Category:Civil_engineering

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.