

1153CE102 (VTUR15)	MAINTENANCE AND REHABILITATION OF STRUCTURES	L	T	P	C
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COURSE CATEGORY: Allied Elective

A. PREAMBLE :

To understand the principles of repair and rehabilitation of concrete structures.

B. PRE-REQUISITES:

- Basic Civil Engineering

C. COURSE EDUCATIONAL OBJECTIVES:

Students undergoing this course are expected to:

- Understand the strength and durability aspects of concrete structures.
- Differentiate the various repair and protection methods for concrete structures.
- Outline the retrofitting of disaster affected structures.

D. COURSE OUTCOMES:

Upon the successful completion of the course, learners will be able to

CO	STATEMENT	K LEVEL
CO1	Contrast the maintenance and damage assessment for concrete structures.	K2
CO2	Infer the durability of concrete regarding repair and rehabilitation.	K2
CO3	Classify different types of special concretes suitable for repair works.	K2
CO4	Illustrate the techniques of repairing concrete elements.	K2
CO5	Summarize the retrofitting methods for buildings subjected to disasters.	K2

E. CORRELATION OF COS WITH POS:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						M						
CO2						M						
CO3					M							
CO4					M							
CO5					M	M						

F. COURSE CONTENT:**UNIT I MAINTENANCE AND REPAIR STRATEGIES 9**

Maintenance, Repair and Rehabilitation, Facets of Maintenance, importance of Maintenance, Various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration.

UNIT II STRENGTH AND DURABILITY OF CONCRETE 9

Quality assurance for concrete – Strength, Durability and Thermal properties, of concrete - Cracks, different types, causes – Effects due to climate, temperature, Sustained elevated temperature, Corrosion - Effects of cover thickness.

UNIT III SPECIAL CONCRETE 9

Polymer concrete, Sulphur infiltrated concrete, Fibre reinforced concrete, High strength concrete, High performance concrete, Vacuum concrete, Self-compacting concrete, Geopolymer concrete, Reactive powder concrete, Concrete made with industrial wastes.

UNIT IV TECHNIQUES FOR REPAIR AND PROTECTION METHODS 9

Non-destructive Testing Techniques, Epoxy injection, Shoring, Underpinning, Corrosion protection techniques – Corrosion inhibitors, Corrosion resistant steels, Coatings to reinforcement, cathodic protection.

UNIT V REHABILITATION AND RETROFITTING OF STRUCTURES 9

Strengthening of Structural elements, Repair of structures distressed due to corrosion, fire, Leakage, earthquake – demolition techniques - Engineered demolition methods – Case studies.

TOTAL: 45 PERIODS

G. LEARNING RESOURCES:

TEXTBOOKS

1. Denison Campbell, Allen and Harold Roper, "Concrete Structures, Materials, Maintenance and Repair", Longman Scientific and Technical UK, 1991.
2. Allen R.T. & Edwards S.C, Repair of Concrete Structures, Blakie and Sons, UK, 1987

REFERENCES

1. Shetty M.S., "Concrete Technology - Theory and Practice", S.Chand and Company, 2008.
2. Dov Kominetzky.M.S., "Design and Construction Failures", Galgotia Publications Pvt. Ltd., 2001
3. Ravishankar.K., Krishnamoorthy.T.S, "Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures", Allied Publishers, 2004.
4. CPWD and Indian Buildings Congress, Hand book on Seismic Retrofit of Buildings, Narosa Publishers, 2008.
5. Gambhir.M.L., "Concrete Technology", McGraw Hill, 2013