REPAIRS AND REHABILITATION OF STRUCTURES

(Professional Elective –II)

Course Code: 19CE2155	**L**	**P**	**C**
	3	**0**	**3**

Course Outcomes:
At the end of the course, the student will be able to:

CO1: Discuss the maintenance and repair strategies for evaluating a damaged structure
CO2: Summarize the concepts of serviceability and durability of concrete
CO3: Discuss the materials used for Repairs using special concretes
CO4: Describe the application and techniques for repairs and protection methods
CO5: Develop the concepts to overcome lesser strength, deflection, cracking and chemical disruption

UNIT-I: **(10 Lectures)**

MAINTENANCE AND REPAIR STRATEGIES

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

LO1: Illustrate maintenance strategies for damaged structures
LO2: Discuss the repair strategies for damaged structures

UNIT-II: **(10 Lectures)**

SERVICEABILITY AND DURABILITY OF CONCRETE

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 and cracking.

LO1: Illustrate the concepts of serviceability
LO2: Summarize the concepts of durability of concrete

UNIT-III: **(10 Lectures)**

MATERIALS FOR REPAIR

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fibre reinforced concrete.

LO1: Illustrate the materials used for repairs using special concrete
LO2: Discuss about various special concretes

UNIT-IV: **(10 Lectures)**

TECHNIQUES FOR REPAIR AND PROTECTION METHODS

Rust eliminators and polymers coating for rebars during repair, foamed concrete, mortar and dry pack, vacuum concrete, Gunite and Shotcrete, Expoxy injection, Mortar repair for cracks, shoring and underpinning. Methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings and cathodic protection. Engineered demolition techniques for dilapidated structures – case studies

LO1: Illustrate the various techniques for Repair

LO2: Discuss about the methods of protection

UNIT-V: (10 Lectures)

REPAIR, REHABILITATION AND RETROFITTING OF STRUCTURES

Repairs to overcome low member strength. Deflection, Cracking, Chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure.

LO1: Describe the concepts to overcome lesser strength, cracking

LO2: Discuss about the cracking and chemical disruption

Text Books:

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. DovKominetzky.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.