B.Tech. IV Year	L	T	P	To	C
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CE426 REPAIR & REHABILITATION OF STRUCTURES

(Dept. Elective - VI)

Course Description and Objective:

The course seeks to recognize the mechanisms of degradation of concrete structures, provide the students with the knowledge of available techniques and their application for

strengthening or upgrading existing structural systems. It also provides how to conduct field monitoring and non-destructive evaluation of concrete structures.

Course Outcomes:

- *Assess strength and materials deficiency in concrete structures*
- *Suggest methods and techniques used in repairing / strengthening existing concrete structures*
- *Apply Non Destructive Testing techniques to field problems*

UNIT-I

Introduction: Deterioration of structures with aging; Need for rehabilitation. Effects due to climat, temperature, chemicals , wear and erosion , design and construction errors , corrosion mechanism , Effects of cover thickness and cracking, Method of corrosion production., corrosion inhibitors , corrosion resistant steels , coatings , cathodic production Distress in concrete /steel structures Types of damages; Sources or causes for damages; effects of damages; Case studies.

UNIT-II

Structural Health Monitoring: An overview of Structural Health Monitoring, Structural Health Monitoring and Smart Materials, Structural Health Monitoring versus Non Destructive Testing, A broad overview of smart materials, Overview of Application potential of SHM.

UNIT-III

Maintenance and Repair Strategies: Definitions: Maintenance, Repair , Rehabilitation, Facets of maintenance , Importance of maintenance , preventive measures on various aspects , assessment procedure for evaluating damaged structure, causes of deterioration – Testing techniques.

UNIT-IV

Materials and Methods of Repair: Special concrete and mortar , Concrete chemicals , special elements for accelerator, strength gain, expansive cement , polymer concrete , sulphur infiltrated concrete , ferro cement, fibre reinforced concrete. Shortcreting; Grouting; Epoxy-cement mortar injection; Crack ceiling.

UNIT-V

Seismic Retrofitting of reinforced concrete buildings: Introduction; Considerations in retrofitting of structures; Source of weakness in RC frame building – Structural damage due to the discontinuous load path; Structural damage due to lack of deformation; Quality of workmanship and materials; Classification of retrofitting techniques; Retrofitting strategies for RC buildings – Structural level (global) retrofits methods; Member level (local) retrofit methods; Comparative analysis of methods of retrofitting.

TEXT BOOKS:

1. Diagnosis and treatment of structures in distress by R.N.Raikar, Published by R&D Centre of Structural Designers & Consultants Pvt.Ltd., Mumbai, 1994.
2. Earthquake resistant design of structures by Pankaj Agarwal and Manish Shrikhande, Prentice-Hall of India, 2006.

REFERENCE BOOKS:

1. Handbook on Repair and Rehabilitation of RCC buildings, Published by CPWD, Delhi, 2002.
2. Denison Campbell, Allen and Harold Roper , Concrete Structures, materials, maintenance and repair , Long man, Scientific and Technical UK 1991.