## STRUCTURE REPAIR AND REHABILITATION

| **Paper Code: ETCE-417** | **L** | **T/P** | **C** |
|---|---|---|---|
| **Paper: Structure Repair and Rehabilitation** | **3** | **1** | **4** |

**INSTRUCTIONS TO PAPER SETTERS:** **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

***Objective****: To help students in understanding the various causes of structural failure and latest techniques in repair and rehabilitation of structures.*

**UNIT I**

**Evaluating concrete in concrete structures**: site survey, cracking, disintegration and spalling, scaling, dusting, distortion, erosion, seepage, crack survey, joint inspections, physical and chemical analysis, NDT testing

**Causes of distress and deterioration**: Accidental loading, chemical reactions, corrosion, freezing and thawing, settlement and movement, shrinkage, temperature changes.

**[T1][No. of Hours: 12]**

**UNIT II**

**Materials and methods for repair and rehabilitation**: planning and design of concrete repair, Autogeneous healing, crack arrest techniques, drilling and plugging, Fiber reinforced concrete, flexible sealing, gravity soak, chemical grouting, hydraulic-cement grouting, jacketing, polymer overlays, polymer coating, polymer injection, polymer concrete, shotcrete, judicious neglect, shrinkage-compensating concrete.

**[T2][No. of Hours: 12]**

**UNIT III**

**Maintenance of concrete:** Stains and stain removal, cleaning details, oil stains, grease, dirt, mildew, asphalt, efflorescence, coating and sealing compounds.

**Specialized repairs:** rehabbing lock walls, blasting lock walls, anchors, pre-placed aggregate concrete, cut-off walls, under water repairs, geomembrane work.

**[T1,T2][No. of Hours: 11]**

**UNIT IV**

**Trouble shooting defects in concrete**: excess water, bad design data, chemical attacks, alakali-aggregate reaction, freezing, moving water and cavitation.

**[T1,T2][No. of Hours:10]**

**Text Books:**


[T1] S.N.Sinha , RCC Design, Tata McGraw-Hill Publishing ltd,2002

[T2] Allen R.T.L, Repair Of Concrete Structures, John Willey and Sons,1987


**References Books:**


[R1] Handbook on repair and rehabilitation of RCC buildings, published by CPWD, Government of India. http://cpwd.gov.in/Units/handbook.pdf

[R2] R. Dodge Woodson [2009]. Concrete Structures: Protection, Repair and Rehabilitation. Elsevier publications.

[R3] B .Sivagnanam –"Rehabilation"- Indian concrete journel, December 2002, vol.76.

[R4] http://www.structural.net/Repair/repair_concrete.html

[R5] http://www.icivilengineer.com/Structural_Engineering/Structure_Maintenance/