

Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE5120 – Maintenance and Rehabilitation of Constructed Facilities

Credit Distribution: C:9 L:3 T:0 P:0 E:0 O:6 TH:0

Course Type: Theory

Description: To understand the causes of various damage and deterioration of structures, scientific principles of assessing the condition of structures, and then evolve suitable repair, strengthening, stabilization, and protection methods for satisfactory performance for an extended period.

Course Content: Deterioration mechanisms of steel and cementitious materials. Condition assessment of structures (principles of various measurement techniques). Surface/near surface repair methods (material requirements, preparation of the repair region, bonding materials, placement methods, etc.). Strengthening and stabilization methods (beams, columns, connections, cracks, etc.). Protection methods (strategies to control corrosion/deterioration, waterproofing, etc.). Maintenance and rehabilitation of steel structures, pavements, and masonry structures. Guest lectures on practical repair exercises

Textbooks

- Notes and other documents provided in the class.
- Concrete Repair and Maintenance Illustrated, Peter H. Emmons, R.S. Means Company Inc. , Kingston, MA, USA.
- Concrete Repair to EN 1504 Diagnosis, Design, Principles and Practice, Michael Raupach, Till Buttner, CRC Press, Taylor & Francis Group, Boca Reton, FL, USA, 2004.
- Repair, Protection, and Waterproofing of Concrete Structures, 3rd Ed., P.H. Perkins, Taylor and Francis, 2006
- Assessment and Renovation of Concrete Structures, Ted Kay, Longman Scientific Technical, USA.
- Concrete Structures- Protection, Repair, and Rehabilitation, Dodge Woodson, Butterworth-Heinemann, Elsevier Publications.
- Concrete Repair Manual, 4th Ed., ISBN-13: 978-0-87031-805-4, Jointly published by the American Concrete Institute (ACI) Farmington Hills MI, USA & International Concrete Repair Institute (ICRI), Rosemont, IL, USA. 2008.
- Maintenance Manual, Central Public Works Department (CPWD), New Delhi, 2012
- Michael T. Kubal- Handbook on Waterproofing, 2nd Edition, Mc Graw Hill Companies Inc., New York.
- Handbook on Seismic Retrofit of Buildings, CPWD, IBC, and IIT Madras, Narosa Publishing House, New Delhi, 2008.
- Mechanics of Materials, 6th ed., James M. Gere, Brookes/Cole a division of Thomson Learning Inc., Belmont, CA, USA, 2004.
- Construction Materials: Their Nature and Behavior, 3rd ed., Eds. J.M. Illston and P.L.J. Domone, Spon Press, 2001

- The Science and Technology of Civil Engineering Materials, J.F. Young, S. Mindess, R.J. Gray & A. Bentur, Prentice Hall, 1998.
- Maintenance, Repair & Rehabilitation & Minor Works of Buildings, P.C. Varghese, Prentice Hall (India) Ltd., New Delhi.

Reference Books: NIL

Prerequisite: NIL