

EAR023	Elective -III (i) Building Repair and Restoration	HR 3-0-0	CR-3
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Objective

Building construction industry is energy intensive and therefore knowledge of maintenance, restoration and retrofitting of buildings are important in the context of sustainable development. Need for building repair and maintenance, cause and effect of building deterioration and defects, and material, methods and techniques of maintenance, repair and restoration are covered in the course.

Module 1

ENVIRONMENTAL IMPACT ON BUILDINGS

Life expectancy of different types of buildings – influence of environmental elements such as heat, moisture, precipitation and frost on buildings- Effect of biological agents like fungus, moss, plants, trees, algae, - termite control and prevention - chemical attack on building materials and components- - Impact of pollution on buildings.

Module 2

DEFECTS AND STRENGTHENING METHODS

Common defects in buildings; Building failures- Causes and effects; Cracks in buildings: types, classification, investigation;
Measures to prevent and control common defects in building; Maintenance philosophy, phases of maintenance: routine preventive and curative maintenance; Fundamental Strengthening measure: beam strengthening, column strengthening, shoring, under pinning and jacketing.

Module 3

MATERIALS FOR REPAIR

Materials for repair: special mortar and concrete, chemicals, special cements and high grade concrete, admixtures of latest origin; Techniques for repair; Surface repair: material selection, surface preparation, rust eliminators and polymers coating; Repair of cracks in concrete and masonry: methods of repair, epoxy injection, mortar repair for cracks: guniting and shotcreting; Waterproofing of concrete roofs.

Module 4

RESTORATION

Introduction to conservation - Materials and methods for conservation and restoration work (with specific case studies) - Adaptive reuse of buildings and its advantages - Retrofitting (case studies), Recycling of building components and materials (case studies).

References

1. Chandler, Ian (1992). ' Repair and Renovation of Modern Buildings', Mcgraw-Hill
2. Nayak, B. S. (2013). ' A Manual of Maintenance Engineering', Khanna Publishers, India
3. Guha, P.K. 'Maintenance and Repairs of Buildings' New Central Book Agency, India.
4. Danish Standards Association, (2004). 'Repair of Concrete Structure to En 1504: A guide for renovation of concrete structures repair materials and systems according to the EN 1504 series', Elsevier, Boston
5. Roger, G. and Hall, F. (2013). 'Building Services Handbook', Routledge, UK.