

Syllabus for Level-11 Post Code: NCB/CDR-02

Solid Mechanics:

Stress–strain behaviour, bending, shear, torsion, combined stresses, buckling, fatigue, creep and fracture mechanics.

Structural Analysis, Design and Optimization:

Analysis of determinate/indeterminate structures; matrix, stiffness and flexibility methods; RC design; structural optimization for strength, serviceability, durability and material efficiency.

Concrete Technology and Advanced Concrete Composites:

Cement chemistry; SCMs; admixtures; mix design; rheology; fresh, hardened and durability properties; HPC, UHPC, SCC, fibre reinforced concrete, alkali-activated/geopolymer concrete, lightweight, mass and repair concretes.

Mechanical and Durability Performance of Concrete:

Strength, stiffness, creep, shrinkage, permeability, chloride ingress, carbonation, sulphate attack, corrosion, service life prediction and durability design.

Structural Assessment, NDT and Rehabilitation:

Condition assessment; NDT/semi-destructive testing; load testing; structural health monitoring; residual life assessment; forensic investigation; repair, retrofitting and strengthening.

Construction Technology, Technical Audit and Project Management:

Modern construction methods; precast/mechanized construction; QA/QC; third-party technical audit; project planning (PERT/CPM); cost, contract, risk and safety management.

Sustainable Construction Materials and Circular Construction:

Low-carbon binders; recycled materials; industrial by-products; construction & demolition waste utilization; sustainable concrete technologies.

Pavement and Infrastructure Materials:

Concrete and pavement materials; rigid/flexible pavements; evaluation, rehabilitation and IRC-based design concepts.

Standards and Guidelines (National & International):

BIS/IS Codes, ACI, ASTM, EN/Eurocodes, ISO, fib Model Code, RILEM, JSCE and related standards/guidelines for cement, concrete, advanced concrete composites, structural design, durability, testing, pavements, quality assurance, repair, rehabilitation and structural performance evaluation.