

## **PCI4I103 DESIGN OF CONCRETE STRUCTURES (3-0-1)**

### **Module I**

Properties of concrete and reinforcing steel, philosophy, concept and methods of reinforced concrete design, introduction to limit state method, limit state of collapse and limit state of serviceability, application of limit state method to rectangular beams for flexure, shear, bond and torsion

### **Module II**

Design of doubly reinforced beams, design of T and L beams, design of one way and two way slabs, design of staircases.

### **Module III**

Design of short and long columns with axial and eccentric loadings, Design of isolated and combined column footings

### **Module IV**

Retaining walls, various forces acting on retaining wall, stability requirement, design of cantilever and counterfort retaining walls,  
Design of water tanks, design requirements, design of tanks on ground, under ground and elevated water tanks.

### **Text Books:**

1. Design of Reinforced Concrete Structure by N. Subramanian, Oxford University Press
2. Limit State Design by A.K.Jain, Neemchand & Bros
3. Reinforced Concrete Design by S U Pillai & D. Menon, McGraw Hill

### **Reference Books:**

1. Design of concrete structures by J.N.Bandyopadhyay, PHI
2. Limit State Design of Reinforced Concrete -P.C Verghese
3. Reinforced Concrete Design by S.N.Sinha, McGraw Hill
4. RCC Design-B.C.Punmia, A.K.Jain and A.K.Jain-Laxmi Publications

## **Design of Concrete Structures Lab**

1. Workability test of concrete: Slump test, compaction factor test and flow table test
2. Cube Test of Concrete(Nominal Mix)
3. Cylinder Test for Concrete(Nominal Mix): Determination of axial stress, longitudinal strain, lateral strain and Poisson's ratio. Plotting of stress-strain curve and determination of modulus of elasticity.
4. Split Tensile Strength Test of Concrete
5. Prism test for determining modulus of rupture of concrete
6. Design of Concrete Mix (As per Indian Standard Method)
7. Failure of RC beam in bending and shear (two point and one point loading)
8. Complete design of a simple load bearing residential building comprising of beams, slab, column, footing, staircases, etc. and the detailing of steel reinforcement.