MVCT – 301(A) Advanced Highway Construction

1. Earthwork and Soling :
Classification of types of highway construction, Suitability of each type under Indian conditions. Selection of base course and surface course.

Selection of soils, construction of embankments, excavation and compaction equipments. Field and laboratory tests for quality control. Stone soling, brick soling, current practices.

Construction of earth roads, gravel roads, soil stabilised roads, water bound macadam. Paved roads (i) bricks (ii) stones.

2. Bituminous Construction:
Properties, requirements and specifications of materials, equipments and plants. Detailed construction procedure of each type. Field and laboratory tests for quality control. Choice of binders under different conditions. IRC, British, and MOST Specifications. Bituminous surface treatments, interface treatments-primecoat, and tackcoat, surface dressing and seal coat, grouted or penetration macadam, bituminous bound macadam, Sheet asphalt, bituminous concrete, mastic asphalt, dense tar surfacing.

3. Cement Concrete Road Construction :
Necessity of providing a base course under cement concrete road construction. Selection of materials, constructions methods, detailed construction procedure, Quality control tests (Lab. and Field). Construction equipments. Classification of various types of joints, necessity of providing each type, method of construction of joints, load transfer devices, dowel bars, tie bars. joints filler and sealer materials, IRC Specifications.

4. Reinforced Cement Concrete Road Construction :
Necessity of providing reinforcement in cement concrete pavements, continuously reinforced concrete pavements, prestressed concrete pavements and fibre reinforced concrete pavements. Selection of the mix, compaction method and construction prucedure for each type. Recommendations under Indian conditions.

5. Construction Planning and Management :
CPM/PERT in Highway Construction.

MVCT – 301(B) Multi Storeyed Buildings

1. Structural systems and their suitability, structural design criteria in planning.

2. Multistoried Buildings, Preliminery design, Analysis of building frames for vertical and lateral loads by approximate method, Matrix methods for the analysis of building frames & computer programming for the same.

3. Analysis of Shear Walled Buildings Design ofsections in reinforced concrete by working stress and limit state methods, Detailing of joints.

4. Yield line Analysis of reinforced concrete slabs, concept of moment redistribution.

5. Foundation - Superstructure interaction, Earthquake effects and design for ductility.

MVCT – 302(A) Advanced Dam Design and Construction

1. Gravity Dams :
River valley projects and their purpose, preliminary investigations and surveys, Selection of site for a reservoir; Types of Dams and their choice. Stability factors; Stresses, Elementary profile, low and high Dams, Forces acting on a Dam. Evolution of the profile of a Dam by Method of Zones, Practical profiles. Design of openings in Gravity Dams, contraction joints. Foundation treatment by Grouting.

2. Spillways :
Design of ogee spillway section, Bucket and Energy Dissipation arrangements : Design and Details of siphon, Shaft, side channel, and chute spillways, Miscellaneous types of spillways. Design of spillway crest gates and sluice gates, hoisting Machines.

3. Elementary Design of Arch Dams :
Definition of an Arch Dam, classification of Arch Dams. Principles of Elastic Theory and applied Trial Load Analysis, Inclined arches, Dome-Dams, Details and Methods of analysis.

4. Earth Dams :
Introduction, Design criteria, against over topping, Control of seepage, Theory of flownets for homogoneous and Zoned embankments. Pore pressure, Stability of slopes, Methods of Analysis, slip circle Method, Protection of slopes, Protection against free passageof water, Rockfill dams.

5. Application of Photoelasticity to the Design of Dams. Use of the Electrical Analogy Method in the Design of Dams, stress compuations with embedded Electrical Instruments.
River Diversion for construction of Dams, Constructional aspects in the Execution of River Valley projects.

MVCT – 302(B) Advanced Foundation Engineering

1. Shallow Foundations :
Bearing Capacity, Terzaghis analysis, Computations of bearing capacity factors. Skempton's analysis. Meyerhof's analysis. Balla's theory. Hansen's theory. Design of Shallow Foundations.

2. Pile Foundation :
Use of piles, Types of piles, Design of Piles, Group action in cohesive and cohesionless soils. Negative skin fricton. Laterally loaded piles. Piles under inclined loads, pile load test, Hrennikoff Method.

3. Engineering with Geosythetics :
Introduction Basic Mechanism of reinforced earth strength characteristics of reinforced soil.

4. Bridge Substructures :
Introduction, elements of bridge substructure, stability analysis of well foundation, design of pie & abutments, sinking of wells.

5. Marine Substructures :
Introduction, Types of Marine structures elements, design criteria, design of gravity wall, piled wharf structure breakwaters.