



DEPARTMENT OF CIVIL ENGINEERING
M.Tech. – in Civil Engineering, Structural Engineering
Syllabus for PG Entrance Test
JET 2022

1. **STEEL STRUCTURE**

Principles of working stress method, Built-up sections and frames, Design of connections, Design of Industrial roofs, Design of simple members and frames. Concept of plastic analysis - beams and frames.

2. **CONCRETE STRUCTURE**

Working stress, Design of beams, slabs, columns, Limit state and ultimate load design concepts, Analysis of beam sections, Bond and development length. Prestressed concrete beams.

3. **STRUCTURAL ANALYSIS**

Statically determinate and indeterminate structures, Displacement methods, Analysis of trusses, arches, beams, cables, and frames, Stiffness and flexibility methods, Influence lines. Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods.

4. **CONSTRUCTION PLANNING AND MANAGEMENT**

Construction activity, Use of Basic principles of network - analysis in form of CPM and PERT, Quality assurance principles, Basic principles of Economic analysis and methods, Cost optimization and resource allocation, Project profitability

5. **ENGINEERING MECHANICS**

System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Frictions and its applications; Centre of mass; Free Vibrations of undamped SDOF system.

6. TRANSPORTATION INFRASTRUCTURE:

Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments. Geometric design of railway Track – Speed and Cant. Concept of airport runway length, calculations and corrections; taxiway and exit taxiway design.

7. SOIL MECHANICS

Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Seepage through soils – two - dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils; Onedimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths..

8. CONSTRUCTION MATERIALS AND MANAGEMENT

Construction Materials: Structural Steel – Composition, material properties and behaviour; Concrete - Constituents, mix design, shortterm and long-term properties. Construction Management: Types of construction projects; Project planning and network analysis - PERT and CPM; Cost estimation.

9. SOLID MECHANICS

Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses.

REFERENCE TEXT BOOKS:

1. Design of Steel Structures by N. Subramanian, Oxford University Press
2. Limit state design of steel structures, McGraw Hill Education (India) publisher.
3. Reinforced concrete structures (Limit state design), ASIN: B079ZYBGDX · Publisher: STANDARD BOOK HOUSE SINCE 1960; 3rd edition (22 February 2018).
4. Construction Planning And Management by P S Gahlot, B M Dhir , New Age International (P) Ltd., Publishers
5. Engineering Mechanics by S.S Bhavikatti,.New Age Engineering Mechanics, (English, Paperback, S S Bhavikatti).
6. Transportation Infrastructure Engineering ,Lester Hoel , By (author) Nicholas Garber , By (author) Sadek, A Multimodal Integration, SI Version, Publication City/Country Florence, KY, United States.
7. Textbook of Soil Mechanics and Foundation Engineering Geotechnical Engineering Series (PB 2018) Paperback – 1 January 2018. by Murthy V. N. S. (Author), C B S publishers.
8. Construction Materials, Methods and Techniques 3Rd Edition by Spence, Thomson India.
9. Fundamentals of Solid Mechanics, A Treatise on Strength of Materials by M L Gambhir, Publisher: Phi Learning Pvt. Ltd-New Delhi.