

Department of Civil Engineering

SYLLABUS FOR ICCR ADMISSION TEST

Transportation Engineering and Planning (TEP) Section

Materials and Pavements

Soil – Soil classification and its systems, Manual identification tests, desirable properties of soil for road construction, Importance of soil subgrade, problems in soil subgrade, sub-soil drainage, soil stabilization, Strength properties of soils.

Road Aggregates –Origin, Physical, mechanical and durability properties of aggregates, desirable properties of aggregates for road construction.

Bitumen –Bitumen sources and manufacturing, bitumen constituents, structure and rheology, types of bituminous binders, their properties, tests and specifications

Bituminous Mixes – Desirable properties of bituminous mixes for bound & unbound base courses and wearing course in accordance with MoRTH specifications, Design of bituminous mixes by Marshall method.

Pavement Structure: Components of pavement structure, functions of subgrade, subbase, base course, binder course and wearing course; specifications for construction of different layers of pavement, quality control during road construction.

Flexible Pavements – Design approach, Elastic layer theory, Stresses in flexible pavements, Design of pavement as per IRC 37

Rigid pavements – Components of rigid pavements, types of joints, dowel and tie bars and their design, wheel load stresses, temperature stress, warping stress, design of rigid pavements based on IRC: 58

Traffic Engineering and Management

Traffic Engineering: Elements of traffic engineering, traffic stream characteristics, Traffic studies on flow, speed, travel time - delay and O-D study, PCU, peak hour factor, parking study, accident study and analysis, black spot identification, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Traffic regulations and control systems, signal design by Webster's method; Types of intersections and channelization; Highway capacity and level of service of rural highways and urban roads, Intelligent Transportation systems.

Geometric Design: Highway alignment and engineering surveys; Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments

Transportation Planning

Urban Transportation Planning: Urban growth mechanism – Urban morphology, Urbanisation & travel demand, Urban travel patterns - Study area delineation- Zoning -Planning surveys - Urban activity system- Sustainable urban transport - Systems approach; Travel demand estimation, data need and sources, survey methodology, trip generation, trip distribution, mode choice, route assignment, random utility models; Urban system components - Urban spatial structure – Accessibility - Location theory - Land use models -Land use transport models, Lowry

&Garin – Lowry models; sustainable transportation – Walk, Bicycle and Public Transport, type and characteristics of urban mass transit systems

Transportation Economics: Generation and screening of project alternatives – Different methods of economic analysis: - Discounting and Non discounting criteria methods – NPV - IRR, Benefit/Cost analysis. Feasibility and evaluation, cost, impacts and performance levels, evaluation of alternatives, analysis techniques, cost benefit analysis, social and financial benefits, Internal Rate of return method for economic and financial viability, valuation of time

REFERENCES:

1. Sarkar P K., Maitri V. Economics in Highway and Transportation Planning, Standard Publisher, New Delhi, 2010.
2. Kadiyali, L.R., Traffic Engineering and Transport Planning, Khanna Publishers, New Delhi, 2002.
3. Khisty C J, Lall B. Kent; Transportation Engineering-An Introduction, Prentice-Hall, NJ, 2005
4. Prithvi Singh Kandhal, Bituminous Road Construction in India, PHI Learning Private Limited, 2016.
5. Rajib B. Mallick and Tahar El-Korchi, Pavement Engineering - Principles and Practices, Second Edition, CRC Press, 2013
6. Hutchinson B.G., Principles of Urban Transportation System Planning, Mc-Graw Hill, 1974.
7. Chakroborty P., Das N., Principles of Transportation Engineering, PHI, New Delhi, 2003
8. Sarkar P., Maitry V., Joshi G.J., Transportation Planning – Principles, Practices & Policies, PHI, New Delhi (2014).
9. Papacostas C.S. and Prevedouros, P.D., Transportation Engineering & Planning, PHI, New Delhi, 2002.
10. Relevant IRC and IS Codes.