GEOMETRIC DESIGN OF HIGHWAYS

PROF. RAJAT RASTOGI
Department Of Civil Engineering
IIT Roorkee

INTENDED AUDIENCE : PG and UG

INDUSTRY SUPPORT : All Consulting companies related to transportation projects need candidates with this information

COURSE OUTLINE :

This course on Geometric Design will prepare the students for suitable vacancies in consulting companies which work in the filed of Transportation Projects. The student will get complete information on the design factors that need to be considered before planning and designing the road stretches; the elements that constitute a road section based on different expected road users; the design of its horizontal and vertical profile; the estimation of road traffic handling capacity which provides ides regarding upgradation; the layouts and safety features at an intersection of two or more roads; and finally associated components that are provided as a part of the overall road system. The course will use the IRC and Indo-HCM guidelines during interactions.

ABOUT INSTRUCTOR :

Prof. Rajat Rastogi is a Professor in Transportation Engineering Group of Civil Engineering Department at IIT Roorkee. He has teaching experience of 31 years. He has taught transportation related curses like Transportation Engineering-I and II, Highway Engineering, Geometric Design, Railway Engineering and Airport Planning, Transportation Planning (and Traffic Engineering). He has contributed to NPTEL course on Railway Engineering which is widely referred. He possesses academic qualification as BE in Civil Engineering and ME in Highway Engineering, and PhD in Transportation Systems Engineering from IIT Bombay.

COURSE PLAN :

Week-1: Introduction, Design factors, functional classification of roads and Space requirements

Week-2: Sight distances – Factors, types, and sight distance under specific conditions

Week-3: Cross-sectional elements – Profiles, Factors controlling, common elements

Week-4: Cross-sectional elements – Specific elements (bicycle and pedestrian facilities, service roads); Road furniture – Categorization

Week-5: Road furniture – Longitudinal markings, Junction markings, Object markings, Messages, Road Traffic Signs

Week-6: Road Traffic signs, Road furniture – delineators, speed breakers; Alignment – Types, Factors, surveys, Horizontal alignment – guiding principles, simple circular curve

Week-7: Skidding and overturning control speeds; Superelevation, Extra-widening,

Week-8: Transition curve, Gradients, Vertical curves – general guidelines and types; Alignment coordination and issues.

Week-9: Good and bad practices; Intersection – Types, Profiles, design principles for at-grade intersections,

Week-10: Visibility, attributes influencing design, factors affecting layouts, Auxiliary lanes, Channelization and Warrants for signalized intersection; Interchanges – Types, design principles, warrants.

Week-11: Ramps – layouts, terminals, weaving sections, metering, lane balancing; Parking facilities – on-street and off-street, Supply and demand, and characteristics; Bus bays and Shelters.

Week-12: Truck Lay byes, Bus Rapid Transport stations and terminals; Toll Plaza layout design, Pedestrian over bridge and subway, Kilometer stone, Clearances and Access control