

Highway Geometric Design

01TR0111

(PEC)

Objective of the Course:

- To introduce concepts and design procedures for different types of road and related facilities.
- To understand the design principles for intersection and roundabouts.
- To impart the knowledge of specifications for different road geometrical elements as per IRC.

Credit Earned: 3

Students learning outcomes:

After successful completion of the course it is expected that student will be able to,

1. Design of cross sectional elements of highway.
2. Design of intersection, roundabout, exit and entry ramp.
3. Design of horizontal and vertical alignment.
4. Evaluate and design parking facility.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
03	0	0	03	50	30	20	25	25	150

Detailed Syllabus

Sr No.	Title of the unit	Number of hours
1	Introduction and Cross section elements of Highway	04
	Classification of road, design control parameters, design of road segments, pedestrian facility, street furniture, bicycle track	
2	Design of Alignment	10
	Horizontal alignment : design and field attainment of super elevation, design of transition curve, necessity of sight distance on a horizontal curve, design of vertical curve, combination of horizontal and vertical alignment	
3	Highway capacity and Level of service	10
	Design parameter of LOS and capacity, Design capacity and LOS 2 lane, 4 lane, 6 lane highways as per IRC and Indo HCM specification	
4	Design of Intersection	10

	Concept, layout, visibility requirement, priority movement, design of roundabout, entrance and exit ramp, acceleration and deceleration lanes, design of grade separated intersection.	
5	Design of Parking facility	08
	Parking dimension, design of on street and off street parking space, concept of smart parking	
		42

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	5%	20%	25%	25%	20%

Instructional Method and Pedagogy:

1. Use of Learning Management system like canvas
2. Demonstration through presentations on power point and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

Recommended Study Material:

Reference Book:

1. A Policy on Geometric Design of Highways and Streets. AASHTO.
2. Indo HCM, CRRI,
3. Highway Engineering by Rogers, M., Blackwell Publishing.
4. Highway Engineering by Wright, P.H., John Wiley & Sons.
5. Transport Planning and Traffic Engineering by O'Flaherty, C. A., Taylor & Francis Group.
6. IRC 73- 1980: Geometric Design Standards for Rural (Non-urban) Highways. Indian Roads Congress, India.
7. IRC 86-1983: Geometric Design Standards for Urban Roads in Plain. Indian Roads Congress, India.