

GOVERNMENT POLYTECHNIC ASTHAWAN, NALANDA

(Department of Civil Engineering)

Programme:	Diploma in Civil Engineering
Semester:	IV
Subject:	Transportation Engineering
Subject Code:	2015405
Subject Credits:	3
Name of the Faculty:	Prof. Saurabh Kumar

Lesson Plan

WEEK	LECTURE NO. (1 Hr Each)	UNIT	TOPIC OF CLASS & DISCUSSION	TEACHING METHOD		
Week-1	1	Unit-1 Overview of Highway Engineering	Role of transportation in the development of nation, Scope and Importance of roads in India.	Lecture/PPT/ Pdf/Video		
	2		Different modes of transportation– land way, waterway, airway. Merits and demerits of roadway and railway.	Lecture/PPT/ Pdf/Video		
	3		General classification of roads	Lecture/PPT/ Pdf/Video		
	4		Selection and factors affecting road alignment.	Lecture/PPT/ Pdf/Video		
Week-2	5	Unit-2 Geometric Design of Highway	Camber: Definition, purpose, types as per IRC–recommendations.	Lecture/PPT/ Pdf/Video		
	6		Kerbs: Road margin, road formation, right of way	Lecture/PPT/ Pdf/Video		
	7		Design speed and various factors affecting design speed as per IRC–Recommendations.	Lecture/PPT/ Pdf/Video		
	8		Gradient: Definition, types as per IRC–Recommendations.	Lecture/PPT/ Pdf/Video		
Week-3	9		Unit-2 Geometric Design of Highway	Sight distance: Definition, types as per IRC–recommendations	Lecture/PPT/ Pdf/Video	
	10			Simple numerical of Sight distance	Lecture/PPT/ Pdf/Video	
	11			Curves: Necessity	Lecture/PPT/ Pdf/Video	
	12			Types of curves: Horizontal, vertical curves.	Lecture/PPT/ Pdf/Video	
Week-4	13			Unit-2 Geometric Design of Highway	Extra widening of roads: numerical examples	Lecture/PPT/ Pdf/Video
	14				Super elevation: Definition, formula for calculating minimum and maximum Super elevation.	Lecture/PPT/ Pdf/Video
	15				Method of providing super-elevation.	Lecture/PPT/ Pdf/Video
	16				Standards cross-sections of national highway in embankment and cutting	Lecture/PPT/ Pdf/Video
Week-6	17	Unit-3 Construction of Road Pavements			Types of road materials and their Tests	Lecture/PPT/ Pdf/Video
	18				Test on aggregates-Flakiness and Elongation Index tests	Lecture/PPT/ Pdf/Video
	19				Angularity Number test, test on Bitumen-penetration.	Lecture/PPT/ Pdf/Video
Week-7	20				Ductility, Flash and Fire point test and Softening point test	Lecture/PPT/ Pdf/Video
	21		Pavement–Definition, Types, Structural Components of pavement and their functions.		Lecture/PPT/ Pdf/Video	
	22		Construction of WBM road. Merits and demerits of WBM road.		Lecture/PPT/ Pdf/Video	
Week-8	23		Unit-3 Construction of Road Pavements		Construction of Flexible pavement/Bituminous Road	Lecture/PPT/ Pdf/Video
	24				Types of Bitumen and its properties.	Lecture/PPT/ Pdf/Video
	25			Cement concrete road-methods of construction, Alternate and Continuous Bay Method	Lecture/PPT/ Pdf/Video	
	26			Construction joints, filler and sealers, merits and demerits of concrete roads, Types of joints	Lecture/PPT/ Pdf/Video	

Week-8	27	Unit-4 Basics of Railway Engineering	Classification of Indian Railways, zones of Indian Railways.	Lecture/PPT/ Pdf/Video	
	28		Permanent way: Ideal requirement, Components	Lecture/PPT/ Pdf/Video	
	29		Rail Gauge, Types of Gauge	Lecture/PPT/ Pdf/Video	
Week-9	30		factors affecting selection of a gauge.	Lecture/PPT/ Pdf/Video	
	31		Rail, Rail Joints-requirements, types	Lecture/PPT/ Pdf/Video	
	32		Creep of rail: causes and prevention.	Lecture/PPT/ Pdf/Video	
Week-10	33		Sleepers-functions and Requirement	Lecture/PPT/ Pdf/Video	
	34		Types- concrete sleepers and their density.	Lecture/PPT/ Pdf/Video	
	35		Rail fixtures- fish plate, spikes	Lecture/PPT/ Pdf/Video	
	36		Rail fastenings –bolts, keys, bearing plates.	Lecture/PPT/ Pdf/Video	
Week-10	37		Unit-6 Track geometrics, Construction and Maintenance	Alignment-Factors governing rail alignment.	Lecture/PPT/ Pdf/Video
	38			Track Cross sections–standard cross section of single and double line in cutting and embankment.	Lecture/PPT/ Pdf/Video
	39	Important terms- permanent land, formation width, side drains.		Lecture/PPT/ Pdf/Video	
	40	Railway Track Geometrics: Gradient, curves-types and factors affecting		Lecture/PPT/ Pdf/Video	
Week-11	41	Grade compensation, super elevation, limits of Super elevation on curves, cant deficiency,		Lecture/PPT/ Pdf/Video	
	42	Negative cant, coning of wheel, tilting of rail		Lecture/PPT/ Pdf/Video	
	43	Branching of Tracks, Points and crossings, Turn out- types, components.		Lecture/PPT/ Pdf/Video	
	44	Functions and inspection. Track junctions: crossovers, scissor cross over, diamond crossing, track triangle.		Lecture/PPT/ Pdf/Video	
Week-12	45	Station -Purpose, requirement of railway station, important technical terms		Lecture/PPT/ Pdf/Video	
	46	Types of railway station, factors affecting site selection for railway station.		Lecture/PPT/ Pdf/Video	
	47	Station yard: Classification –Passenger, goods, locomotive and marshalling yards.		Lecture/PPT/ Pdf/Video	
	48	Function & draw backs of marshalling yards.		Lecture/PPT/ Pdf/Video	

Text/Reference Books:

(i) Highway Engineering by Khanna S.K. Justo, CEG and Veeraragavan, A Nem Chand and Brothers, Roorkee.

(ii) Transportation Engineering by L.R. Kadiyali, Khanna Book Publishing Co., Delhi.

(iii) A Text book of Railway Engineering by Saxena SC and Arora SP, Dhanpat Rai Publication.