

# INSTITUTE OF ENGINEERING AND MANAGEMENT

## GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005

### LESSON PLAN

**Name of the Subject:** Railway and Bridge Engineering

**Name of the Faculty:** Bhupendra Pratap Dongri

**Semester:** Fifth Semester

**Semester From:** July to December

**Branch:** Civil Engineering

**No. of Weeks:** 15 Weeks

Week	Class Day	Theory/ Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	1.0 Introduction : 1.1 Railway terminology
	2 <sup>nd</sup>	1.2 Advantages of railways 1.3 Classification of Indian Railways
	3 <sup>rd</sup>	2. Permanent way 2.1 Definition
	4 <sup>th</sup>	Components of a permanent way
2 <sup>nd</sup>	1 <sup>st</sup>	Concept of gauge
	2 <sup>nd</sup>	Different gauges prevalent in India
	3 <sup>rd</sup>	Suitability of these gauges under different
	4 <sup>th</sup>	3. Track materials 3.1 Rails 3.1.1 Functions and requirement of rails
3 <sup>rd</sup>	1 <sup>st</sup>	3.1.2 Types of rail sections , length of rails 3.1.3 Rail joints – types, requirement of an ideal joint
	2 <sup>nd</sup>	3.1.4 Purpose of welding of rails & its advantages 3.1.5 Creep definition, cause & prevention
	3 <sup>rd</sup>	3.2 Sleepers 3.2.1 Definition, function & requirements of sleepers 3.2.2 Classification of sleepers 3.2.3 Advantages & disadvantages of different types of sleepers
	4 <sup>th</sup>	3.3 Ballast 3.3.1 Functions & requirements of ballast 3.3.2 Materials for ballast
4 <sup>th</sup>	1 <sup>st</sup>	3.4 Fixtures for Broad gauge 3.4.1 Connection of rails to rail-fishplate, fish bolts 3.4.2 Connection of rails to sleepers
	2 <sup>nd</sup>	4. Geometric for Broad gauge 4.1 Typical cross – sections of single
	3 <sup>rd</sup>	double broad gauge railway track in cutting
	4 <sup>th</sup>	embankment
5 <sup>th</sup>	1 <sup>st</sup>	4.2 Permanent & temporary land width
	2 <sup>nd</sup>	Gradients for drainage
	3 <sup>rd</sup>	Super elevation – necessity & limiting valued
	4 <sup>th</sup>	Numerical problem
6 <sup>th</sup>	1 <sup>st</sup>	Numerical problem
	2 <sup>nd</sup>	Numerical problem
	3 <sup>rd</sup>	Numerical problem
	4 <sup>th</sup>	5.0 Points and crossings

7 <sup>th</sup>	1 <sup>st</sup>	5.1 Definition
	2 <sup>nd</sup>	necessity of Points and crossings
	3 <sup>rd</sup>	5.2 Types of points
	4 <sup>th</sup>	& types of crossings with tie diagrams
8 <sup>th</sup>	1 <sup>st</sup>	diagrams
	2 <sup>nd</sup>	6.0 Laying & maintenance of track
	3 <sup>rd</sup>	6.1 Methods of Laying
	4 <sup>th</sup>	maintenance of track
9 <sup>th</sup>	1 <sup>st</sup>	Details of a permanent way inspector
	2 <sup>nd</sup>	Section – B : BRIDGES 7.0 Introductions 7.1 Definitions 7.2 Components of a bridge
	3 <sup>rd</sup>	7.3 Classification of bridges. 7.4 Requirements of an ideal bridge
	4 <sup>th</sup>	8.Bridge Site investigation, hydrology & planning 8.1 Selection of bridge site
10 <sup>th</sup>	1 <sup>st</sup>	8.2 Bridge alignments
	2 <sup>nd</sup>	8.3 Determination of flood discharge
	3 <sup>rd</sup>	8.4 Waterway & economic span
	4 <sup>th</sup>	8.5 Afflux, clearance & free board 8.6 Collection of bridge design data & sub surface investigation
11 <sup>th</sup>	1 <sup>st</sup>	9.Bridge foundation
	2 <sup>nd</sup>	9.1 Scour depth minimum depth of foundation 9.2 Types of bridge
	3 <sup>rd</sup>	pile foundation-, pile driving,
	4 <sup>th</sup>	well foundation – sinking of wells caisson foundation
12 <sup>th</sup>	1 <sup>st</sup>	foundations – spread foundation
	2 <sup>nd</sup>	9.3 Cofferdams
	3 <sup>rd</sup>	10.Bridge substructure and approaches 10.1 Types of piers
	4 <sup>th</sup>	10.2 Types of abutments
13 <sup>th</sup>	1 <sup>st</sup>	10.3 Types of wing walls
	2 <sup>nd</sup>	10.4 Approaches
	3 <sup>rd</sup>	11.0Permanent bridges 11.1 Masonry bridges
	4 <sup>th</sup>	11.2 Steel bridges – classification with sketches
14 <sup>th</sup>	1 <sup>st</sup>	11.3 Concrete bridges – classification, brief description with sketches 11.4 IRC bridge loading
	2 <sup>nd</sup>	12.Culvert & cause ways 12.1 Types of culverts - brief description
	3 <sup>rd</sup>	12.2 Types of causeways - brief description
	4 <sup>th</sup>	PREVIOUS YEAR QUESTION DISCUSSION
15 <sup>th</sup>	1 <sup>st</sup>	REVISION