Th3. RAILWAY & BRIDGE ENGINEERING

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	5th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

The course will expose the students to the requirements posed by railways and bridges and how these requirements are different from roads. The course shall acquaint the students with common engineering terminology and prepares them to pursue higher courses in the aspect.

B. COURSE OBJECTIVES

On completion of the course, students will be able to

1. Explain railway terminology
2. Comprehend the track components and relate to the material or geometric aspects that can be used for these
3. Describe methods of laying and maintaining the track
4. State the requirements for an ideal bridge and describe types of foundation and substructures
5. Classify the bridges and identify the components
6. Select the bridge sites in context of hydrologic requirements

C. TOPIC WISE DISTRIBUTION OF PERIODS

Chapter	Name of topics	Hours
1	Introduction	2
2	Permanent way	5
3	Track materials	10
4	Geometric for broad gauge	10
5	Points and crossings	4
6	Laying & maintenance of track	4
Section – B: BRIDGES		
1	Introduction to bridges	2
2	Bridge site investigation, hydrology & planning	5
3	Bridge foundation	8
4	Bridge substructure and approaches	5
5	Culvert & Cause Ways	5

D. COURSE CONTENTS:

Section – A: RAILWAYS

1 Introduction

1.1 Railway terminology
1.2 Advantages of railways
1.3 Classification of Indian Railways

2 Permanent way

2.1 Definition and components of a permanent way
2.2 Concept of gauge, different gauges prevalent in India, suitability of these gauges

under different conditions

3 Track materials

3.1 Rails
3.1.1 Functions and requirement of rails
3.1.2 Types of rail sections, length of rails
3.1.3 Rail joints – types, requirement of an ideal joint
3.1.4 Purpose of welding of rails & its advantages
3.1.5 Creep- definition, cause & prevention
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
3.3 Ballast
3.3.1 Functions & requirements of ballast
3.3.2 Materials for ballast
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

4 Geometric for broad gauge

4.1Typical cross – sections of single & double broad gauge railway track in cutting and embankment
4.2 Permanent & temporary land width
4.3 Gradients for drainage
4.4 Super elevation – necessity & limiting valued

5 Points and crossings

5.1 Definition, necessity of Points and crossings
5.2 Types of points & crossings with tie diagrams

6 Laying & maintenance of track

6.1 Methods of Laying & maintenance of track
6.2 Duties of a permanent way inspector

Section – B: BRIDGES

1 Introduction to bridges

1.1 Definitions
1.2 Components of a bridge
1.3 Classification of bridges
1.4 Requirements of an ideal bridge

2 Bridge site investigation, hydrology & planning

2.1 Selection of bridge site, Alignment,
2.2 Determination of Flood Discharge
2.3 Waterway & economic span
2.4 Afflux, clearance & free board

3 Bridge foundation

3.1 Scour depth minimum depth of foundation
3.2 Types of bridge foundations – spread foundation, pile foundation- well foundation – sinking of wells, caission foundation

3.3 Coffer dams

4 **Bridge substructure and approaches**
4.1 Types of piers
4.2 Types of abutments
4.3 Types of wing walls
4.4 Approaches

5 **Culvert & Cause ways**
5.1 Types of culvers – brief description
5.2 Types of causeways – brief description

E. SYLLABUS COVERGE UPTO INTERNAL ASSESSMENT
Chapters 1,2,3,4 of Section A & Chapters 1,2 of Section B

F. Recommended Books

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	Chandra & Agrawal	Railway Engineering	Oxford Publication
3	S.C.Sexena & S.P.Arora	A Text book of Railway Engineering	Dhanpat Rai Publications
4	S. C. Rangwala	Railway Engineering	Charotar Publication
5	S.P. Bindra	Bridge Engineering	Dhanpat Rai Publications