

LESSON PLAN - RAILWAY & BRIDGE ENGINEERING

Name of Faculty – Smt. Amrapalli Sahoo, Sr. Lecturer

Total No. of Contact Hours – 60 Hours

Total no. of credit – 04

Course Code – CEPC503 | Semester – 5th | Total Marks – 100

Sl. No.	Week	Day	Topic	Remarks
1	Week 1	Day 1	Introduction to Railways – Importance and scope	
2		Day 2	Railway terminology	
3		Day 3	Advantages and classification of Indian Railways	
4		Day 4	Definition and components of a permanent way	
5	Week 2	Day 5	Concept of gauge and different gauges in India	
6		Day 6	Suitability of different gauges under varying conditions	
7		Day 7	Functions and requirements of rails	
8		Day 8	Types and sections of rails; rail length	
9	Week 3	Day 9	Rail joints – types and requirements of an ideal joint	
10		Day 10	Purpose and advantages of welding of rails	
11		Day 11	Creep in rails – definition, causes and prevention	
12		Day 12	Sleepers – definition, functions and requirements	
13	Week 4	Day 13	Classification of sleepers – wooden, steel, concrete etc.	
14		Day 14	Advantages and disadvantages of different types of sleepers	
15		Day 15	Functions and requirements of ballast	
16		Day 16	Materials used for ballast and their suitability	
17	Week 5	Day 17	Rail fixtures and fastenings – fishplates, fish bolts and rail clips	
18		Day 18	Connection of rails to sleepers	
19		Day 19	Typical cross-sections of single and double broad gauge track	
20		Day 20	Permanent and temporary land width for railway track	
21	Week 6	Day 21	Gradients for drainage and their necessity	
22		Day 22	Super elevation – necessity and limiting values	
23		Day 23	Definition and necessity of points and crossings	
24		Day 24	Types of points and crossings with tie diagrams	
25	Week 7	Day 25	Laying of railway track – methods and procedures	
26		Day 26	Maintenance of track – general requirements	
27		Day 27	Duties and responsibilities of a Permanent Way Inspector	
28		Day 28	Common track defects and remedial measures	

29	Week 8	Day 29	Modern developments in track structure	
30		Day 30	Revision and assessment of Railway Engineering section	
31		Day 31	Introduction to bridges – definition and importance	
32		Day 32	Components of a bridge	
33	Week 9	Day 33	Classification of bridges based on function, material and span	
34		Day 34	Requirements of an ideal bridge	
35		Day 35	Selection of bridge site and alignment	
36		Day 36	Bridge hydrology – determination of flood discharge	
37	Week 10	Day 37	Waterway and economic span concepts	
38		Day 38	Afflux, clearance and freeboard – definitions and significance	
39		Day 39	Scour depth and minimum depth of foundation	
40		Day 40	Types of bridge foundations – spread, pile, well, caisson	
41	Week 11	Day 41	Sinking of wells and related problems	
42		Day 42	Cofferdams – purpose and types	
43		Day 43	Bridge substructure – types of piers	
44		Day 44	Types of abutments and their functions	
45	Week 12	Day 45	Types of wing walls and their arrangements	
46		Day 46	Bridge approaches and their design considerations	
47		Day 47	Culverts – definition, importance and components	
48		Day 48	Types of culverts – box, slab, pipe and arch types	
49	Week 13	Day 49	Causeways – definition and types	
50		Day 50	Differences between culverts and causeways	
51		Day 51	Bridge bearings – types and functions (concept only)	
52		Day 52	Bridge flooring systems (brief overview)	
53	Week 14	Day 53	Bridge expansion joints and articulation	
54		Day 54	Bridge maintenance and inspection	
55		Day 55	Bridge loadings as per IRC standards (concept only)	
56		Day 56	Bridge failures – causes and preventive measures	
57	Week 15	Day 57	New materials and technologies in bridge construction	
58		Day 58	Case studies of modern bridges in India	
59		Day 59	Environmental and safety considerations in bridge design	
60		Day 60	Revision of bridge engineering concepts	

LESSON PLAN - BUILDING MATERIAL & CONCRETE TECHNOLOGY

Name of faculty – Smt. Amrapalli Sahoo, Sr. Lecturer

Total No. of contact hours – 45 hours

Total no. of credit - 03

Sl. No.	Week	Day	Topic	Remarks
1	Week 1	Day 1	Scope of construction materials in Building, Transportation, Environmental and Irrigation Engineering	
2		Day 2	Selection of materials for different civil engineering structures and classification of materials	
3		Day 3	Requirements and characteristics of good building stone; quarrying and dressing methods	
4	Week 2	Day 4	Structure, properties, uses, seasoning and defects of timber	
5		Day 5	Use of bamboo in construction	
6		Day 6	Asphalt, bitumen and tar: properties and uses	
7	Week 3	Day 7	Properties and types of lime; uses in construction	
8		Day 8	Types of soil and suitability for construction	
9		Day 9	Properties and uses of sand	
10	Week 4	Day 10	Classification of coarse aggregates	
11		Day 11	Constituents of brick earth; traditional, modular and special bricks	
12		Day 12	Characteristics and tests of good bricks; classification and suitability	
13	Week 5	Day 13	Manufacturing of burnt clay, fly ash bricks and aerated blocks	
14		Day 14	Flooring tiles and pre-cast concrete blocks	
15		Day 15	Plywood, particle board, veneers, laminated boards, glass and metals	
16	Week 6	Day 16	Composition and manufacturing of cement (dry & wet process flow chart)	
17		Day 17	Types and field tests on cement	
18		Day 18	Physical properties of OPC and PPC; grades and BIS codes	
19	Week 7	Day 19	Laboratory tests: fineness, consistency, setting time, soundness, compressive strength	
20		Day 20	Storage of cement and effects on properties	
21		Day 21	Specifications of special cements: Rapid hardening, Low heat, PPC, Sulphate resisting, etc.	
22	Week 8	Day 22	Aggregates: requirements and classification	
23		Day 23	Fine aggregates: properties, grading, silt content, crushed sand concept	
24		Day 24	Coarse aggregates: properties, grading, crushing, impact and abrasion values	
25	Week 9	Day 25	Water and admixtures: quality, permissible limits, and types of admixtures	
26		Day 26	Grades of concrete as per IS 456	
27		Day 27	Water-cement ratio and its significance	

28	Week 10	Day 28	Workability of concrete and its tests (slump cone, compaction factor, Vee-Bee)	
29		Day 29	Segregation, bleeding and prevention measures	
30		Day 30	Properties of hardened concrete: strength and durability	
31	Week 11	Day 31	Impermeability and related properties	
32		Day 32	Concrete mix design objectives and methods	
33		Day 33	Mix design as per IS 10262 (procedural steps)	
34	Week 12	Day 34	Non-destructive testing of concrete: purpose and importance	
35		Day 35	Rebound hammer test: working principle and factors affecting readings	
36		Day 36	Ultrasonic pulse velocity test (IS 13311 Part 1 & 2)	
37	Week 13	Day 37	Batching, mixing, transportation, placing and compaction of concrete	
38		Day 38	Curing and finishing operations	
39		Day 39	Formwork: types, materials and requirements	
40	Week 14	Day 40	Stripping time for removal of formwork as per IS 456	
41		Day 41	Waterproofing: importance, methods and materials	
42		Day 42	Joints in concrete: types and joining methods	
43	Week 15	Day 43	Materials used for filling joints	
44		Day 44	Special concretes: Ready mix, Fiber reinforced, High performance, Self compacting and Light weight concrete	
45		Day 45	Cold weather concreting: effects and precautions	
46	Week 16	Day 46	Hot weather concreting: effects and precautions	
47		Day 47	Revision of concrete technology concepts	
48		Day 48	Course review and assessment preparation	