

BRIDGE ENGINEERING

Week	Topic	No. of Lectures planned	No of Lectures Delivered
1	Definition, components of bridge, classification of bridges, selection of site , economical span, aesthetics	4	
2	Consideration, necessary investigations and essential design data. Standard Specifications for Roads and Railways	4	
3	Width of carriage way, clearance, various loads to be considered for the design of roads and railway bridges,	4	
4	Detailed explanation of IRC standard live loads.	4	
5	Design Consideration for R. C. C. Bridges	4	
6	Various types of R.C.C. bridges(brief description of each type)	4	
7	Design of R.C.C. culvert and T-beam bridges	4	
8	Design Consideration for Steel Bridges: Various types of steel bridges	4	
9	Brief description of each design of truss and plate girder bridges	4	
10	Hydraulic & Structural Design: Piers, abutments, wing-wall and approaches.	4	
11	Brief Description: Bearings, joints, articulation and other details	4	
12	Bridge Foundation: Various types,	4	
13	Necessary investigations and design criteria of well foundation.	4	

Railway & Airport Engineering

Week	Topic	No. of Lectures planned	No of Lectures Delivered
1	Rail transportation and its importance in India. Permanent way: requirements and components	3	

2	Gauges in India and abroad. Selection of gauge. Coning of wheels. Adzing of sleepers. Rails: functions	2	
3	Composition of rail steel, types of rail sections, requirements of an ideal rail section, length of rails	3	
4	Defects in rails. Creep of rails. Long welded rails and continuously welded rails. Stations: functions and classification. Junction, non-junction and terminal stations. Yards: functions, types	3	
5	Sleepers: functions, requirements of an ideal sleeper. Types of sleepers: wooden, cast iron, steel and concrete sleepers, advantages,	2	
6	Disadvantages and suitability of each type. Sleeper density. Runway orientation, Wind Rose diagram. Basic runway length. Corrections to basic runway length. Runway patterns	3	
7	Fastenings for various types of sleepers: fish plates, spikes, bolts, bearing plates, keys, chairs, jaws, tie bars.	3	
8	Elastic fastenings. Ballast: functions, requirements, types of ballast and their suitability	3	
9	Necessity. Turnout: various components, working principle. Switch: components, types. Crossing: components and types. Design elements of a turnout, design of a simple turnout. Layout plan of track junctions: crossovers, diamond crossing, single-ouble slips, throw switch, turn table, triangle.	3	
10	Signaling, Interlocking And Train Control Signals: objects, types and classification. Semaphore signal: components, working principle	3	
11	Requirements / principles of a good interlocking system. Brief introduction to devices used in interlocking.	2	
12	Gradients, grade compensation. Super elevation, cant deficiency, negative super elevation. Maximum permissible speed on curves.	3	
13	Tractive resistances, types. Hauling capacity of a locomotive. Stations, Yards And Track Maintenance	3	

14	Air transportation, its importance and characteristics, status in India. Layout plan of an airport and its basic elements: terminal area, apron, taxiway, runway, hanger.	3	
15	Aircraft characteristics, their effect on elements of an airport. Site selection of an airport. Classification of airports.		

Industrial Waste Water Treatment

Week	Topic	No. of Lectures planned	No of Lectures Delivered
1	Effects of industrial wastes on streams,	3	
2	Sewerage systems and wastewater treatment plants	2	
3	Minimizing the effects of industrial effluents on waste water treatment plants and receiving streams-conservation of water,	3	
4	Population equivalent. Industrial effluent standards for disposal into inland surface water sources and on land for irrigation	3	
5	Process change, reuse of waste water,	2	
6	volume reduction, strength reduction, neutralization, equalization and proportioning	3	
7	Study of the following Industries from waste generation,	3	
8	Sewerage systems and wastewater treatment plants.	3	
9	quality and its treatment including brief overview of manufacturing process:	3	
10	Textile, tannery, sugar mill, distillery, dairy, pulp & paper, metal plating, oil refinery,	3	
11	nitrogenous fertilizers, thermal power plants and radio active wastes.	2	

GYOSYNTHETICS ENGINEERING

Week	Topic	No. of Lectures planned	No of Lectures Delivered
1	Historical Development, The Nomenclature, Function, Use around the World, Applications,	3	

2	Development in India.Raw Materials – Their Durability and Ageing Raw Materials,	2	
3	Durability, Degrading Agencies, Polymers, Biological Resistance.	3	
4	Chemical Resistance, Weathering Resistance	3	
5	Fibres, Yarn, Nonwoven Geotextiles, Woven Geotextiles, D.S.F. Fabrics.	2	
6	Geogrids- Testing and Evaluation: Factors influencing Testing, Sampling, Physical Properties	3	
7	Mechanical Properties under Uniaxial loading, Creep Testing	3	
8	Erosion Control with Geogrids: Wind Erosion, Rain Water Erosion,	3	
9	Advantages, Mechanism	3	
10	Placement of Geogrid Bearing Capacity Improvement with Geogrids:	3	
11	Modes of Failure, Friction Coefficient, Experimental Studies	2	
12	Case Study: Dharoidam,	3	
13	Application of Geosynthetics in Water Resource Projects:	3	
14	Hiran II Dam, Meda Creek Irrigation Scheme,	3	
15	Lining of Kakarpar Canal		