Faculty of Engineering and Technology

Bachelor of Technology

Effective from Academic Year: 2018-19

Branch Name:	Civil Engineering
Semester/Year:	Semester VI / Third Year
Subject Title:	Railway, Bridge And Tunnel Engineering
Subject Code:	1ET1060603
Pre-requisite:	-

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (Marks)
03	01	00	04	70	30	-	-	100

Subject Contents			
Sr. No	**Topic**	**Total Hours**	**Weightage (%)**
1	**Railway :** Development of railways in India, Permanent way and railway track components, different gauges in India, conning of wheels, function and types of rails, rail sections, defects in rails, creep of rails, rail joints and welding of rails, sleepers –types, spacing and density, rail fixtures and fastenings, ballast, subgrade and embankment.	05	12
2	Geometric design of railway track: gradients, grade compensation, speed of trains on curves, super elevation, cant deficiency, negative super elevation, curves, widening on curves.	05	13
3	Railway traction and track resistance, stresses in railway track–rails, sleepers, ballast. Points and crossings – turnouts, switches, crossings. Track junctions types, splits, diamond, gauntlet, scissor crossovers. Railway stations -requirements, facilities, classifications, platforms, loops, sidings. Railway yards –types, required equipments in yards. Signalling and control system –objectives, classification, Interlocking of signals and points.	06	15
4	Railway track-construction, drainage, maintenance. Recent developments in railways–high speed trains, modernization in track for high speed, Metro rails, Monorail, automation in operation and control. Safety in railways – accidents and remedial measures.	04	10
5	**Bridges:** Classification of bridges – with respect to construction materials, structural behavior of super structure, span, sub structure, purpose. Temporary and movable bridges. Factors affecting site selection. Various loads/stresses acting on bridges. Bridge hydrology –design discharge, water way, afflux,	14	30

	scour depth, economical span. Bridge components – foundation, piers, abutments, wing wall, approach, bearings, floor, girders, cables, suspenders. Methods of erection of different types of bridges. River training works and maintenance of bridges. Testing and strengthening of bridges. Bridge architect.		
6	**Tunnels:** Necessity/advantage of a tunnel, Classification of Tunnels, Size and shape of a tunnel, Alignment of a Tunnel, Portals and Shafts, Methods of Tunneling in Hard Rock and Soft ground, Mucking, Lighting and Ventilation in tunnel, Dust control, Drainage of tunnels, Safety in tunnel construction.	08	20

Course Outcome:

After learning the course the students should be able to:

1. Know about railway track components, their materials, size, function and importance
2. Carry out geometric design of railway track
3. Know about various components in diverging, merging and crossings of railway tracks, stations, yards,
4. Signaling, interlocking and control systems.
5. Know about requirements of railway track for high speed trains, safety aspects and maintenance.
6. Understand about different types of bridges, their components, loads/stresses acting on bridges,
7. Requirement and function of the components, hydrological design, methods of erection, maintenance of bridges.
8. Understand about importance, types, methods of construction, mucking, ventilation, lining and lighting in Tunnels.

Reference Books:

1. Satish Chandra and M.M. Agrawal, Railway Engineering, Oxford University Press, New Delhi
2. S.C. Saxena and S. P. Arora, A Text Book of Railway Engg., Dhanpat Rai & Sons, New Delhi
3. S.C. Rangwala, K.S. Rangwala and P.S. Rangwala, Principles of Railway Engineering, Charotar Publishing House, Anand.
4. S.P. Bindra, Principles and Practice of Bridge Engineering, Dhanpat Rai & Sons, New Delhi
5. S.C. Saxena, Tunnel Engineering, Dhanpat Rai & Sons, New Delhi
6. D.J. Victor, Essential of Bridge Engineering, Oxford & IBH Pub. Co. Ltd. Mumbai

E-Resources :

http://nptel.ac.in/