GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VI

Civil Engineering

Subject Name: **Railway, Bridge and Tunnel Engineering**
Subject Code: **160603**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	1	0	4	70	30	50

Module - I: Railway

Sr. No	Course Content	Total Hrs.
1.	**Introduction:** History, Indian Railways, recent developments. **Railway Track Gauge:** Different gauges on Indian Railways, loading gauge, construction gauge, Problems caused by change of gauge. **Alignment of Railway lines:** Importance, Basic requirements of an ideal alignment, selection of a good alignment. **Track and Track stresses:** requirements. Forces acting on Track, coning of wheels **Rails:** Functions, types of rails, Standard rail sections, Causes of creep, Effects of creep, Measures to reduce creep. **Sleeper:** Functions, requirements, types of sleepers, and spacing of sleepers. **Ballast:** Function, specifications of track ballast. **Track fittings:** Fittings and fastening **Geometric design of Track:** Necessity for geometric design, Details of geometric design of track, Design of Track, Gradients, Grade compensation on curves. Curves and Superelevation.	24

	Resistance to Traction: Resistance to-friction, wave action, speed, track irregularity, wind, gradient, curvature, starting and accelerating. Stress in rails, sleepers, ballast and formation, **Points and crossings:** Important terms, track layouts and sketches of turn out, diamond crossing, gauntletted track, triangle, double junction, cross over-between two parallel tracks with intermediate straight length, scissors cross over, Single slip, Double slip, Gathering line. **Railway Stations and yards:** Purpose, facilities required at railway stations. Requirements of station yard, Classification of Railway stations, Types of Yards, **Signaling and interlocking:** objectives of signalling, classification of signals, Interlocking	

Module II: Bridge

Sr. No	Course Content	Total Hrs.
1.	**General:** Site investigation, waterway calculations, scours depth, afflux, economic span. **Classification:** Classification of superstructures with respect to structural behavior and material used, types of substructures, flooring joints, bridge bearings, movable bridges, temporary bridges. **Construction methods:** Methods of erection of various types of bridges, Superstructures and substructures. **Maintenance:** Testing and strengthening of bridges.	15

Module III : Tunnel

Sr. No	Course Content	Total Hrs.
1.	Necessity/Advantage of a tunnel, Classification of Tunnels, Size and shape of a tunnel, Alignment of a Tunnel, Portals and Shafts, Methods of Tunnelling in Hard Rock and Soft ground, Lighting and Ventilation in tunnel, Dust control, Drainage of tunnels, Safety in tunnel construction.	9

Note:

Module I carries 50 percent weight age
Module II carries 30 percent weight age
Module III carries 20 percent weight age

Term work based on the above course content

Text 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 Engineering, Dhanpat Rai & Sons, New Delhi
3. S.P. Bindra, Principles and Practice of Bridge Engineering, Dhanpat Rai & Sons, New Delhi
4. S.C. Saxena, Tunnel Engineering, Dhanpat Rai & Sons, New Delhi
5. D.J. Victor, Essential of Bridge Engineering, Oxford & IBH Pub. Co. Ltd. Mumbai