

**Course Name** : Civil Engineering Group.      **Course Code:** CE/CS/CR/CV

**Semester** : Fourth

**Subject Title** : Transportation Engineering      **Subject Code:** 9048

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
04	--	--	03	80	20	--	--	--	100

**Rationale:**

This subject caters to the need of technician engaged in the investigation, planning, construction & maintenance of railway, bridges and tunnels. In Practical field each component of transportation is a specialized branch of engineering. This subject aims at basic knowledge about railway, bridges, and tunnels in respect of their various types, materials used, functions of component parts, methods of construction, planning principles, aspects of supervision and maintenance.

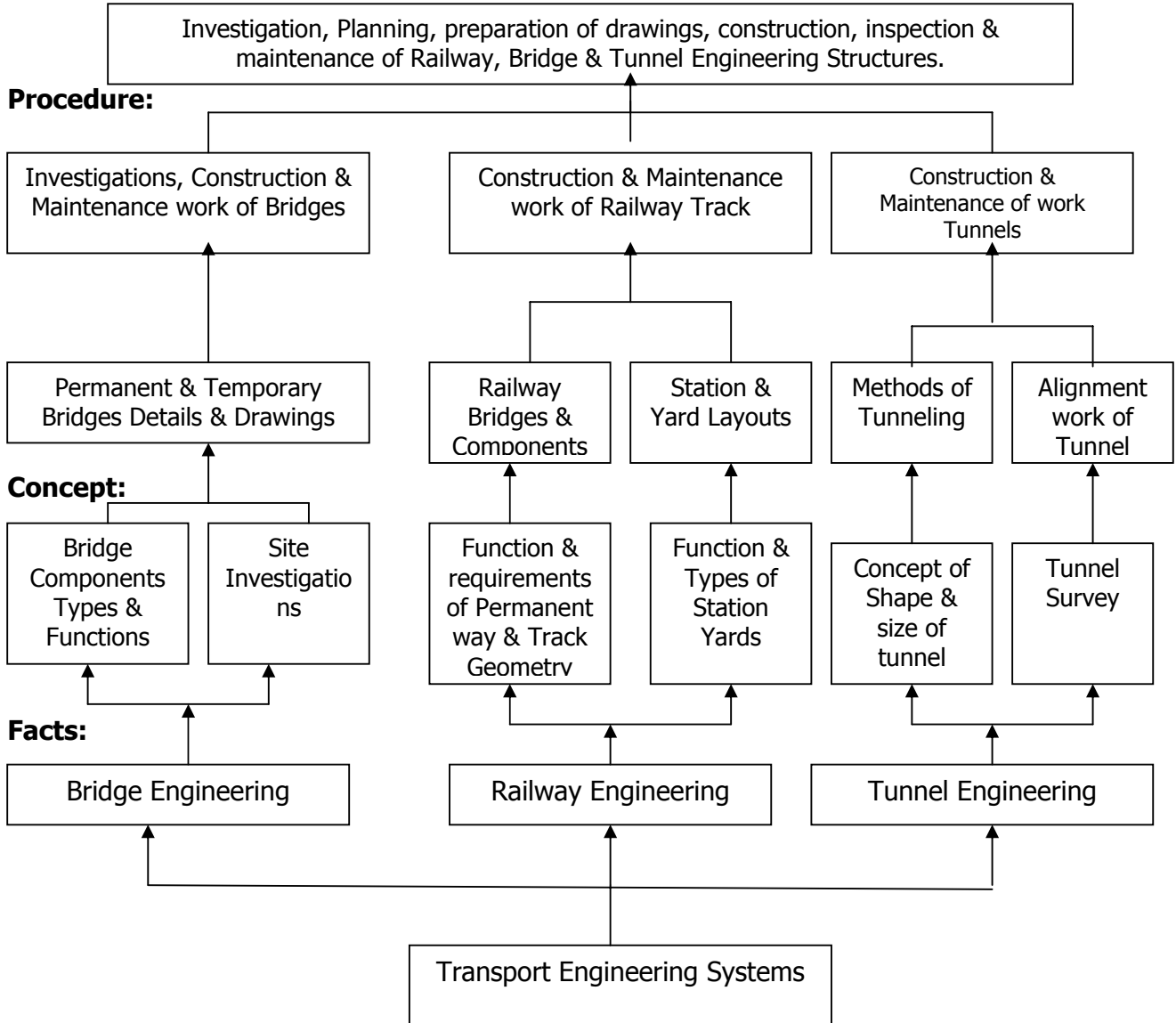
**Objectives:**

Students should be able to..

1. Know component parts of railway, bridges and tunnels.
2. Understand methods of survey and investigation of alignment of railway, bridges and tunnels.
3. Organize, supervise and coordinate the construction activities related to railway, bridges and tunnels.
4. Understand, prepare and interpret the drawings related to work.

## Learning Structure:

### Application:



**Content:** Theory

Chapter	Name of the Topic	Hours	Marks
01	<p><b>Overview of Transportation Engineering</b></p> <p>1.1 Role of transportation in the development of nation.</p> <p>1.2 Modes of transportation system – roads, railway, airways, waterways, Importance of each mode, comparison and their relative merits and demerits.</p> <p>1.3 Necessity &amp; importance of Cross drainage works for roads &amp; railways.</p>	02	04
02	<p><b>Railway Engineering.</b></p> <p>2.1 Alignment and Gauges            Classification of Indian Railways, zones of Indian Railway.            Alignment- Factors governing rail alignment.            Rail Gauges – types, factors affecting selection of gauge.            Rail track cross sections – standard cross section of BG &amp; M.G Single &amp; double line in cutting and embankment.</p> <p>2.2 Permanent ways            Ideal requirement, component parts.            Rails – function &amp; its types. Rail Joints – requirements, types, Creep of rail , causes &amp; prevention of creep.            Sleepers – functions &amp; Requirement, types – wooden, metal, concrete sleepers &amp; their suitability, sleeper density.            Ballast – function &amp; different types with their properties, relative merits &amp; demerits.            Rail fixtures &amp; fastenings – fish plate, bearing plates, spikes, bolts, keys, anchors &amp; anti creepers.</p> <p>2.3 Railway Track Geometrics.            Coning of wheels, tilting of rails, Gradient &amp; its types, Super elevation limits of Super elevation on curves, cant deficiency negative cant, grade compensation on curves.</p> <p>2.4 Branching of Tracks            Definition of point &amp; crossing, a simple split switch turnout consisting of points and crossing lines. Sketch showing different components, their functions &amp; working.            Line sketches of track junctions-crossovers,</p>	25	30

	<p>scissor cross over, diamond crossing, triangle.  Inspection of points and crossings</p> <p>2.5 Station and Yards :  Site selection for railway stations, Requirements of railway station, Types of stations (way side, crossing, junction &amp; terminal)  Station yards , types of station yard, Passenger yards, Goods yard Locomotive yard – its requirements, water column , Marshalling yard – its types.</p> <p>2.6 Track Maintenance-  Necessity, types, Tools required and their function, organisation, duties of permanent way inspector, gang mate, key man</p>		
<b>03</b>	<p><b>Bridge Engineering :</b></p> <p>3.1 Site selection and investigation  Factors affecting selection of site of a bridge.  Bridge alignment  Collection of design data  Classification of bridges according to function, material, span, size, alignment, position of HFL.</p> <p>3.2 Component parts of bridge.  Plan &amp; sectional elevation of bridge showing component parts of , substructure &amp; super structure.  Different terminology such as effective span, clear span, economical span, waterway, afflux, scour, HFL, freeboard, etc.  Foundation – function, types  Piers-function, requirements, types.  Abutment – function, types  Wing walls – functions and types.  Bearing – functions, types of bearing for RCC &amp; steel bridges.  Approaches –in cutting and embankment.  Bridge flooring- open and solid floors</p> <p>3.3 Permanent and Temporary Bridges-  Permanent Bridges - Sketches &amp; description in brief of culverts, causeways, masonry, arch, steel, movable steel bridges, RCC girder bridge, prestressed girder bridge, cantilever, suspension bridge.  Temporary Bridges- timber, flying, floating bridges</p> <p>3.4 Inspection &amp; Maintenance Of Bridge.  Inspection of bridges  Maintenance of bridges &amp; types – routine &amp; special maintenance.</p>	<b>23</b>	<b>30</b>

<b>04</b>	<b>Tunnel Engineering.</b> 4.1 Definition, necessity, advantages, disadvantages 4.2 Classification of tunnels. 4.3 Shape and Size of tunnels 4.4 Tunnel Cross sections for highway and railways 4.5 Tunnel investigations and surveying –Tunnel surveying locating center line on ground, transferring center line inside the tunnel. 4.6 Shaft - its purpose & construction. 4.7 Methods of tunnelling in Soft rock-needle beam method, fore-poling method. line plate method, shield method. 4.8 Methods of tunnelling in Hard rock-Full-face heading method, Heading and bench method, drift method. 4.9 Precautions in construction of tunnels 4.10 Drilling equipments-drills and drills carrying equipments 4.11 Types of explosives used in tunnelling. 4.12 Tunnel lining and ventilation.	<b>14</b>	<b>16</b>
	<b>Total</b>		

### Learning Resources:

#### 1. Books:

Sr.No.	Name of Book	Author	Publisher
01	Railway Engineering	S.C. Saxena	Dhanpatrai & sons
02	Railway Track	K.R. Antia	The New Book Co. Pvt. Ltd Mumbai
03	Principles of Railway Engineering	S.C. Rangwala	Charotar Publication
04	Principles and Practice of Bridge Engineering	S.P. Bindra	Dhanpatrai & sons
05	A Text Book of Transportation Engineering	N.L.Arora and S.P. Luthra	IPH New Delhi
06	Elements of Bridge Engineering	J.S. Alagia	Charotar Publication
07	Bridge Engineering	D.R. Phatak	Everest Publisher
08	Elements of Bridges	D. Johnos Victor	Oxford & IBH Publishing co.
09	Road, Railway and Bridges	Birdi & Ahuja.	Std. Book House
10	Tunnel Engineering	S.C. Saxena	Dhanpatrai & sons
11	Explosive Engineering	C. B. Navalkar	--

#### 2. IS / International Codes. : IS 4880, I.S. 5878, Part-I to X.