

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING

Semester: 4

Subject Name: Transportation Engineering

Sr. No.	Course content
A	ROADS
1	Introduction <ul style="list-style-type: none"> 1.1 Importance, Advantages of Roads. 1.2 Road Alignment, Types of alignment, Importance of alignment. 1.3 Factors affecting alignment.
2	Road Geometrics <ul style="list-style-type: none"> 2.1 Cross- section of road and its components, Function of each component, Cross- section of road as per IRC. 2.2 Camber, Sight distance, Super elevation, Widening on curves, Transition curve, Road gradient, Vertical curve.
3	Road Drainage <ul style="list-style-type: none"> 3.1 Importance, Purpose, Methods of Surface drainage, Methods of Sub-surface drainage.
4	Road Structure and Construction <ul style="list-style-type: none"> 4.1 Types of Pavements, Functions of Pavements, Stability, Layout and construction of Earth Road. 4.2 Soil stabilisation, Necessity, Principles and methods. 4.3 Construction of WBM and Bitumen road. 4.4 Tests on bitumen. 4.5 Road side Arboriculture.
5	Traffic Engineering <ul style="list-style-type: none"> 5.1 Types and purpose of Traffic survey 5.2 Traffic control devices. <ul style="list-style-type: none"> - Signs, Signals , Markings
6	Maintenance of Roads <ul style="list-style-type: none"> 6.1 Deficiencies in Flexible Pavements. 6.2 Maintenance of -Earth and Stabilized roads,WBM and Bitumen Road, Shoulders, Surface & Subsurface drainage system. 6.3 Maintenance Schedule.

B	BRIDGES
7	Introduction 7.1 Importance, Components, Classification. 7.2 Low- cost bridge
8	Investigation for Bridge 8.1 Selection of site, Factors affecting the selection of site. 8.2 Square and skew alignment. 8.3 Terms related to bridge : - Length of bridge, Linear waterway, Effective Linear waterway, Afflux, Free board, Vertical clearance, High Flood Level (HFL), Formation level, Scour, Economic span
9	Bridge Foundation 9.1 Functions of Bridge Foundation, Types of Loading, Requirements of bridge foundation. 9.2 Classification of bridge foundation- Shallow foundation, Deep foundation.
10	Bridge Sub- structure and Super –structure 10.1 Components, Types of piers, Functions of abutment, Pier and weep holes. 10.2 Importance of bearings, Types of bearings, Advantages of different bearings.
11	Maintenance of Bridges 11.1 Deterioration of bridge structure- Factors affecting amount of Deterioration, Preventive measures. 11.2 Defects in Bridge- Various types of bridge defects, Remedial measures to rectify defects. 11.3 Inspection Report – Purpose, Necessity and its use, How to prepare effective and purposeful inspection report.
C	RAILWAYS
12	Introduction 12.1 Importance, Role of Civil Engineers in construction and maintenance, Components of railway track. 12.2 Railway Gauges, definition, Types, Uniformity of gauge. 12.3 Cross- Section of permanent way as per IRS, Functions of various components, Method of fixing rails with prestressed concrete and wooden sleepers, Functions of rail joints.
13	Points, Crossings and Yards 13.1 Functions of Points and crossings, Components of turnouts, Types of crossings

	<p>13.2 Functions of railway stations, Requirement of railway stations .</p> <p>13.3 Functions of goods and passenger yards.</p>
14	<p>Maintenance of Railway Track</p> <p>14.1 Introduction- Maintenance Programme.</p> <p>14.2 Monsoon, Pre-monsoon & Post- monsoon maintenance.</p> <p>14.3 Causes for maintenance, Routine maintenance, Tools for railway track maintenance, their functions.</p> <p>14.4 Surface defects and their remedial measures.</p>
D	HARBOURS
15	<p>Introduction</p> <p>15.1 Importance of water Transport.</p> <p>15.2 Classification of harbour based on utility and location, Requirement of good harbour, Constituents of harbours and their functions.</p> <p>15.3 Ports – its classification, important ports of India, Littoral drift, Tides, Waves and winds, Shore protection works.</p>
16	<p>Breakwater</p> <p>16.1 Importance, Alignment, Classification, Method of protection.</p> <p>16.2 Method of mound construction.</p> <p>16.3 Importance of wall breakwater, Method of wall breakwater construction. Merits and demerits of mound type and wall type breakwater.</p> <p>16.4 Use of Jetty, Fenders, Piers, Wharves, Dolphins, Trestle and Moles.</p>
17	<p>Docks</p> <p>17.1 Importance, Types of Docks, Arrangements of basins and Docks, Use of repair Dock, Method of dry docking, Use of floating dry docks, Use of wet dock, lift dock and dry dock, Pumping plant, Slip waves.</p>
18	<p>Navigational Aids</p> <p>18.1 Importance, Types of navigational aids, Requirements of signals.</p> <p>18.2 Light house, Beacon lights, Floating navigational aids.</p>
19	<p>Dredging</p> <p>19.1 Necessity, Classification of dredging works, Maintenance, Improvement, Sundry.</p> <p>19.2 Types and choice of dredgers, Use of dredged material.</p>

Term Work:-

1. The students shall draw the dimensional sketches (along with brief Note) of Cross- section of road, road junctions, road signs, road curves & widening.
2. Carry-out the following tests for bitumen:
 - (i) Penetration Test (ii) Flash & Fire point Test (iii) Softening point Test.
3. Carry-out the following tests on Aggregates :
 - (i) Aggregate Impact Test (ii) Los-Angles abrasion Test (iii) C.B.R. Test.
4. At least One visit to each of the following shall be arranged and students Shall be required to submit a brief report of the visits as part of their term work.
 - (i) A Road under construction or an existing road having typical features.
 - (ii) A major bridge (RCC or Steel)
 - (iii) A Dock/Harbour(iv) A Railway track.

Reference Books:

Sr. No.	Name of Books	Author
1.	Highway Engineering	S.K.Khanna & C.R.G. Justo, Roorkee
2.	Highway Engineering	S.P.Bindra
3.	Principles and Practice of Highway Engineering	S.C.Sharma & C.C.Sharma
4.	Highway Engineering and Airports	K.L.Bhagat & S.B.Sehgal
5.	Roads, Railways, Bridges & Tunnel Engineering	T.D.Ahuja & G.S.Birdie
6.	Roads, Railway, Bridge & Tunnel Engineering	B.L.Gupta & A.K.Gupta
7.	Highway Engineering	L.R.Kadiyali
8.	Traffic & Transportation Engineering	L.R.Kadiyali
9.	Manual for Maintenance of Roads	M.O.T.(Road wing 1983)IRC
10.	Traffic Engineering. & Transport Planning	L.R.Kadiyali
11.	Highway Engineering	S.C.Rangwala
12.	Transportation Engineering Vol-I ,II	Vazirani & Chandola
13.	Docks & Harbour	OZA & OZA
14.	A course in Docks & Harbour Engineering	S.P.Bindra