GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN TRANSPORTATION ENGINEERING

TEACHING SCHEME (w. e. f. Jan' 12)

SEMESTER- VI

SR. NO	SUB. CODE	SUBJECT	TEACHING SCHEME (HOURS)			CREDITS
			THEORY	TUTORIAL	PRACTICAL	
1	2360603	Advanced Construction Technology	3	0	0	3
2	2360604	Advanced Construction Technology Practice	0	0	2	2
3	2366001	Traffic Engineering -II	2	0	0	2
4	2366002	Traffic Engineering –II Practice	0	0	2	2
5	2366003	Pavement Design & Evaluation	3	0	0	3
6	2366004	Pavement Design & Evaluation Practice	0	0	2	2
7	2366005	Highway Construction & Maintenance	3	0	0	3
8	2366006	Project - II	0	0	12	12
		TOTAL	**11**	**0**	**18**	**29**

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN TRANSPORTATION ENGINEERING
SEMESTER- VI

Subject Name: Advanced Construction Technology
Subject Code: 2360603

1. RATIONALE

Advanced Construction Technology is an essential course to all civil engineering students. The civil engineering technicians should know the advanced methods and technologies of construction, plants and equipment used in construction etc. Lateral forces-their effects resistive systems are covered in this course with special maintenance techniques. Scope for seminar is included to strengthen the teaching learning process. Selection of seminar shall be made from the magazines related to civil engineering based on the relevant topics of advance construction technology.

2. OBJECTIVES:

The Student Should Be Able To:

1. Understand the new technologies used in construction field.
2. Understand the use of different types of tools, plants and equipment used in construction industry.
3. Understand the effective layouts of equipment significance of time scheduling and Resource balancing.
4. Understand the phenomenon of earthquake engineering, its effects & design considerations etc.
5. Understand the special methods of maintenance, pre maintenance, suitable measures etc.
6. Develop the ability to prepare reports, seminars etc.

Sr. No.	Subject Content	Total Hrs.
1	**INTRODUCTION and MODERN MATERIALS OF CONSTRUCTION** 1.1 Understand the scope of learning the course Advanced Construction Technology. 1.1.1 State the advanced types of civil Engineering structures I Multistoried building II Chimney III Elevated reservoir IV Dams and retaining walls V Bridges and Hydraulic structures. VI Industrial structures VII Marine and offshore structures. VIII Tall structures	3

	1.1.2 Introduction of the effect of lateral forces on buildings. i Wind ii Water iii Earthquake 1.1.3 Special techniques used in erection of steel structures & temporary structures 1.1.4 Special repair techniques. 1.1.5 Admixtures of concrete, Use of waste products and industrial by-products in concrete making, Thermal insulation and acoustic absorption materials.	
2	**PLANTS AND EQUIPMENT US CONSTRUCTION** 2.1 a. Earthmoving machineries b. Handling equipment c. Hoisting equipment d. Conveying equipment e. Pumping equipment f. Compacting equipment g. Pile driving equipment h. Plants for Grouting, Guniting i. Drilling equipment j. Hot mix plant k. Concrete and mixing plant 2.2 Factors affecting the selection of equipment. Depending on various parameters. 2.3 Equipment for excavation Power shovel Dragline Clamshell Scoop Trenching machine Wheel mounted belt loaders. 2.4 Earthmoving equipment Tractors Bulldozers Graders Scrapers Rippers 2.5 Hauling equipment Trucks Wagon Dumpers Cable ways Aerial Tramways	**4**

	2.6 Hoisting equipment Derrick – Pole Gin – Pole Crane Power driven scotch derrick crane Hand operated crane Locomotive crane Gantry crane Tower crane Shear leg Lattice Girder Winches Blocks/Jacks Elevators. Ladders 2.7 Conveying equipment Belt conveyors Buckets Chutes Buggies 2.8 Pumping equipment Water pumps Concrete pumps 2.9 Compacting equipment 2.9.1 Rollers (Earth compaction) Smooth surface roller Sheep foot roller Grid roller Pneumatic roller Tamping roller Vibrating roller Vibrating plates Vibratory compactors 2.9.2 Vibrators for Concrete consolidation Internal vibrator Surface vibrator Platform vibrator Form vibrator 2.10 Equipment used for Production of Aggregate. 2.10.1 List the equipment used I Crusher a. Jaw crusher b. Gyratory crusher c. Roll crusher d. Cone crusher	

	II Rod & Ball mill III Screens IV Log washer 2.10.2 Machineries and equipments used for bituminous road. 2.11 Machineries used for construction of Asphalt road. I Batch type hot mix plant II Pavers 2.11.1 Explain in brief working of above machineries. 2.11.2 Draw line diagram of batch-type hot-mix plant and label component parts 2.11.3 Machineries and equipment used for Large concrete work. 2.12 Machineries and equipment used for concrete works 1. Central mixing plant. 2. Transit mixer agitating for ready mixed concrete. 3. Hoist 4. Tower crane 5. Chutes 6. Belt conveying 7. Pumps 8. Vibrators 9. Chilling plant and cooling of concrete. 10. Cable ways 2.12.1 Sketch line diagram / flow diagram showing operations performed in constructing a large concrete project. 2.13 Dredging equipment 2.14 Element of cost for machineries and equipment used in construction	
3	**DEEP EXCAVATION** 3.1 Shallow and deep excavation 3.1.1 Define shallow excavation. 3.1.2 Define Deep excavation. Give Examples. 3.1.3 Differentiate shallow and deep excavations. 3.2 Predict problems likely to occur in excavation 3.2.1 Explain necessity of timbering in trenches. 3.2.2 Label the component parts of timbering on a sketch. 3.2.3 State the precautions to be taken during timbering. 3.3 Significances of dewatering 3.3.1 Define dewatering 3.3.2 State the reasons for dewatering 3.3.3. Give the conditions to the students for deciding the requirements for dewatering. 3.3.4 Explain how dewatering is done in different situations like: i) Deep excavation ii) Water logged area iii) Docks	**3**

	iv) Pile foundation 3.3.5 State the methods of dewatering Single and multistage dewatering Well point system of dewatering 3.3.6 Explain the procedures/methods of dewatering in different situations like i . Construction of drain ii . Construction of deep well iii . Freezing iv. Chemical consolidation system (Grouting system). v. Well point vi . Electro-osmosis	
4	**CONSTRUCTION OF PILE FOUNDATION** 4.1 Use of piles in foundation 4.1.1 Define shallow and deep foundation as per I. S. specifications 4.1.2 Distinguish between shallow and deep foundation with respect to design. 4.1.3 State the situations where deep foundations are must. 4.2 Types of piles. 4.2.1 State the function of different types of pile like - load bearing - Friction - Sheet piles etc 4.2.2 Classify piles with respect to Materials like timber, steel, concrete pre cast – cast in situ, composite etc. 4.2.3 State the factors influencing the selection of piles. 4.2.4 List pile accessories used in construction 4.3 Importance of pile foundation in foundation designs. 4.4. Explain the methods of pile driving 4.5 Enumerate causes of settlement of piles. - Negative friction - Pulling out of piles 4.6 Construction of under reamed piles 4.6.1 Decide the dimensions of under reamed piles i. diameter of pile ii. Depth of pile iii. size of under reamed bulb iv. minimum reinforcement v . spacing of pile 4.6.2 Empirical equation used for ultimate bearing capacity of under reamed piles 4.6.3 Know method of testing for under reamed piles. 4.7 Loss in energy due to impact and other than impact Load barring capacity of pile foundation: Equations & tests (Gravity loading and reaction loading) 4.7.1 Resistance and loss in energy	**4**

	4.8 Discuss the losses due to several factors like impact etc. Well foundation Island method for well sinking	
5	**COFFER DAMS** 5.1 The necessity of cofferdam 5.1.1 Define cofferdam 5.2 Sketch types of cofferdam 5.2.1 Explain with suitable sketches types of cofferdam like. I Earthen cofferdam ii Rock fill cofferdam iii Cellular cofferdam iv Single walled cofferdam V Double walled cofferdam 5.2.2 Discuss utility of above cofferdams in different situations 5.3 Force acting on cofferdam 5.3.1 List forces considered in the design of cofferdams like: A. Water pressure B. Self weight C. Silt pressure D. Uplift pressure. 5.3.2 Seepage of water below cofferdam 5.4 Discuss the economic height of cofferdam 5.4.1 Explain in your own words concept of satisfactory height with respect to normal flood level.	**3**
6	**CAISSONS** 6.1 Meaning of the term caisson 6.1.1 Define caissons 6.1.2 Distinguish caisson with pile foundation 6.1.3 Distinguish between caisson and cofferdam 6.2 Uses of caissons 6.2.1 State the use of caisson in following situations i . Bridge pier ii Marine structure iii. Hydro power station 6.3 Classify type of caissons 6.3.1 State the type of caissons as I . Open caissons ii . Closed or Box caissons iii . Pneumatic caissons 6.3.2 Explain with sketches types of caissons and label the component parts 6.3.3. Select suitable caissons for given different situations 6.4 Driving process for caissons	**2**

	6.4.1 Explain procedure of driving i. Open caissons ii. Box caissons iii. Pneumatic caissons. 6.4.2 Problem likely to occur to the persons working in pneumatic caisson I . Caisson sickness II. Caisson's diseases. Tilting of caissons and its restoration.	
7	**DRILLING AND BLASTING** 7.1 Define drilling operation 7.1.1 Explain necessity of drilling for the purpose of blasting & other uses in hard rock or in earth. 7.2 Terminology used for drilling 7.3 Factors affecting the selection of drilling method & equipment. 7.4 Types of drilling – Inclined, Horizontal & Vertical. 7.4.1 Heading – Full/ partial face heading and banding 7.5 Necessity of selecting the drilling pattern for blasting 7.5.1 Explain how the size of the hole depends upon A .The type and size of drill used B . Depth of hole C .Type of rock D . Maximum size of rock required. 7.5.2 Discuss the economy of drilling hole 7.5.3 Factors helping in analyzing the drilling operations 1 Quantity required m of length 2 Explain in kg / m^3 of rock 3 Explain in kg/m of hole 7.6 Effect of air pressure on drilling operation 7.7 Analyze factors affecting the optimum drilling pressure 7.8 Use of bentonite /mud slurry in drilling 7.9 Define blasting 7.10 Terminology used for blasting 7.10.1 Enlist the explosives a . Dynamite b . Ammonium nitrate explosive c . Slurry d . ANFO or AN/FO e . RDX 7.11 Define terms like - i. Dynamite ii. Blasting caps iii. Prime line iv. Safety fuse v. Stemming	**4**

	vi. Blast hole vii. Primer viii. Prime detonator 7.12 Explain explosive process 7.12.1 Packing of blast in hole & plugging with mud rods 7.12.2 Types of blasting – sequential and simultaneous blasting 7.12.3 Detection of misfire/ miss blast holes 7.12.4 Draw a sketch of blast hob & enlist part /material 7.13 General precautions required for blasting I. Safety measures II. Do & Don't observed etc. 7.14 Necessity of storing explosives properly 7.15 Give salient features of a magazine building 7.16 Effect of air pressure on drilling. 7.16.1 Know the effect of increased air pressure on maintenance and repairs of drills. 7.17 Building demolition using explosives.	
8	**TEMPORARY STRUCTURES** 8.1 Explain form work 8.1.1 Materials used in form work 8.1.2 State advantages of steel form work 8.1.3 Advantages of timber forms 8.1.4 Requirements of a good form work 8.1.5 Loads on form work 8.1.6 Guiding points to the design of form work 8.2 Column form work 8.2.1 Sketch the column form work & label the parts - Shuttering - Side yokes - Wedges 8.3 Slab & beam formwork 8.3.1 Sketch the formwork for R.C.C. beam & label the parts. 8.3.2 Design formwork for the beam & slab floor from given data. 8.4 Sketch slip formwork 8.4.1 Sketch & label components of slip from work 8.4.2 State advantages of slip form work 8.5 Explain necessity of hanging form works and trestles 8.5.1 Sketch A. Crib B. A trestle 8.5.2 Importance of use of crib in maintenance of external surfaces of buildings. 8.5.3 Use of trestles in internal work like: i. Painting ii. Electrification	**4**

	iii. Maintenance 8.6 Form work for domes and arches. 8.6.1 Sketch formwork for domes i. Solid ii. Suspended 8.7 Scaffolding & shoring 8.8 Cantilever method of Pre-stressed concrete bridge construction .	
9	**ERECTION OF STEEL STRUCTURES** 9.1 Problems faced in erecting steel structure 9.1.1 State the problems in the cases like: i. Roof truss ii. Building / Industrial components. iii. Plate girder iv. Launching a portion of bridge girder v. Large span lattice girder. 9.2 Equipment & tackles used for erecting steel structure 9.2.1 List the equipment used. 9.2.2 Select appropriate equipment for erecting steel structure for given situation. 9.2.3 Explain with neat sketch the detailed procedure for i. Erection of roof truss ii. Erection of building components iii. Launching a portion of steel bridge. iv. Erection of plate girder. v. Erection of large span lattice girder vi. Erection of chimney vii. Erection of overhead tank.	**4**
10	**EARTHQUAKE ENGINEERING** 10.1 General Principles of Planning of building relates to Earthquake 10.2 Points affecting the selection of materials. 10.3 Design consideration for buildings. 10.4 General construction consideration. 10.5 Framed structures. 10.6 Geometrical layout - Shape and orientation of buildings 10.6.1 Distribution of loads. 10.6.2 Wall panels. 10.6.3 Opening in walls. 10.6.4 Requirements for wall beams etc. 10.7 Unframed building. 10.7.1 Minimum thickness of walls. 10.7.2 Reinforcing bends. 10.7.3 Height of walls. 10.8 Opening in walls.	**3**

	10.9 Partition walls. 10.10 Load Bearing walls. 10.11 Miscellaneous 10.12 Foundation for Earthquake structures 10.13 Anchoring of buildings and massive structures	
11	**SPECIAL MAINTENANCE TO BUILDINGS** 11.1 Philosophy of failures. 11.1.1 Impact of failure. 11.1.2 Failures in ancient times. 11.1.3 Recent failures. 11.1.4 Accountability and liability. 11.1.5 Factors affecting failures. - Structural system - Performance observations - New concepts and materials. - Costing and lowest bids. 11.1.6 Traumatic effects of failure. 11.2 Format & check list for investigations data collection and reporting. - Structural parameters. - Building monitoring format. - Reporting failures and performance. - Compilation by Architect & Engineer 11.2.1 Damage assessment. 11.3 Selection of construction chemicals during restoration. 11.3.1 Factors affecting selection. 11.3.2 Common terms. 11.3.3. Application characteristics. 11.3.4 Properties of adhesive. 11.3.5 Types of adhesives. 11.3.6 Method of applications. 11.4 Specifications for important items of work. - Sealing of cracks by injection of epoxy resins. - Sealing of Honey-combed and segregation areas with cement grouting. - Repairing concrete with epoxy mortar. - Repairing brick work with epoxy mortar. - Sealing of cracks in brick masonry by epoxy mortar / cement mortar. - Repairing of concrete with cement mortar / concrete troweling. - R.C.C. Jacketing. - Repairing of reinforced cement concrete - Repairing of settled Ground floor by Grouting. - Grouting method for controlling dampness in walls. 11.5 Failure during restoration of structures. 11.5.1 Problems of failed structures. 11.5.2 Balance during restoration.	**5**

	- Propping. - Bond contribution for balance. - Observation around opening. - Cracks in masonry 11.5.3 Repairs to balconies. 11.5.4 Problems and solution for load bearing walls. 11.5.5 Replacement of building elements. 11.6 Case studies. 11.7 Demolition of buildings-methods and care to be taken off. Underpinning – suitable methods and precautions	
12	**BUILDING SERVICES AND COMPONENTS** 1. Lifts and escalators. 2. Classification 3. Types of lifts 4. Lift codes and rules 5. Types of lift controls 6. Types of lift operations 7. Structural provisions 8. Strength considerations 9. Lift pit 10. Fire safety 11. Pits and overheads 12. Elevators 13. Accidents and safety precautions 14. Fire fighting services 15. Classification of fire 16. Grades of fire Hazards 17. Classification of building and building material according to fire. 18. Codes and local municipal rules & regulations 19. Modes of fire and fire fighting. 20. First aid. 21. Provision in building from fire safety measures (IS 1641) 22. Internal fire hydrants in multi strayed buildings (IS 3844) 23. Fire fighting requirements as per national building code. 24. Fire detection. 25. Fire alarm system. 26. Acoustics and integrated services 27. Noise, Noise control, and noise in buildings. 28. Effective absorption co-efficient 29. Reverberation time 30. False ceiling, design, construction and types – materials suitably used. 31. Provisions is building for air conditioning like plant room, AHLP rooms cooling 32. Towers.	**3**

	33. Types of air conditioning units. 34. Concepts , applications & advantages of thermal insulation	
	Total	**42**

Text Books:

1 Building construction — S.P. ARORA & S.P. BINDRA
2 Building Construction Engineering — GURCHARANSINGH
3. Building construction — B.C. Punmia

Reference Books:

1. Construction, planning equipment & methods. - ROBERT L. PEURIFOY WILLIAM B. LEDBETTER
2. Building Construction — SUSHIL KUMAR
3. Learning from failures — R.N. RAIKAR
4. Durable structure through planning for preventive measures — R.N. RAIKAR
5. Diagnosis and Treatment structure in Distress — R.N. RAIKAR
6. Building structures — JAMES ABROSE.
7. Standard handbook of civil engg. — Gurcharansingh
8. Building construction — S.C. Rangwala
9. Civil Engineering Practice (I,II,III) — Kaushik, Asawa & Ahuja
10. Services in Building Complex — V.K.Jain
11. Civil Engineering Construction — Antill & Ryan
12. Pile Foundations Tomlinson
13. Dharatikamp & Navnirman Manviya Technology Forum (In Gujarati) Earthquake special
14. Relevant IS codes/Building codes ,NBC.

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN TRANSPORTATION ENGINEERING
SEMESTER- VI

Subject Name: Advance Construction Technology Practice
Subject Code: 2360604

NOTE: - Following are the minimum experiences required, but the college can do more experiences if possible.

Laboratory Experiences:

Sr. No.	Subject Content	Total Hrs.
1	**SKETCH** (1) (a) Sketch at least five transporting equipment and prepare salient features of it. (b) Sketch at least three excavating equipment and prepare salient features of it. (c) Sketch any three compacting equipment (d) Sketch any three hoisting equipment & label it. (2) (a) Timbering for different situations / types of soil & depth. (b) Dewatering methods for different cases. i Well point system. ii Electro-osmosis. (c) Different types of piles with their features. i Friction pile & load bearing pile. ii Under reamed pile. (3) (a) Different types of cofferdams. (b) Pneumatic caisson. (c) Slip form work. (Tall structures) (d) Slab – beam form work. (e) Column form work.	**Home Work**
2	**FIELD VISITS : (Visit & Report)** (a) Visit to the crusher site. Draw layout & prepare brief report. (b) Visit to the hot mix plant. Prepare brief report. (c) Visit to construction site where cement concreting is done for 10 hrs. per day. Studying layout of equipment used. Resource balancing, Time scheduling etc d) Visit to a site where heavy equipments are in use.	**8**

3	**CASE STUDIES** (any three) Based on special maintenance.	**6**
4	**SEMINAR : (Cover all most all topics of Theory subject)** Topic of Seminar shall be given to a group of three to five students. The students are required to submit & present / defend the Seminar in presence of students & teachers.	**14**
	Total	**28**

Term Work

1. Term work should also include certification by subject teachers and counter signed by HOD.

2. Incorporate appropriate field visit with concerned report to enforce the Advanced Construction Technology.

3. Practical examination is to be defended (along with term work) in front of External and Internal examiners .

4. Practical examination will include followings:

Viva□□

Explanation□□ of Sketches, Seminar , Field Visit , and Case Study .

Reference Books:

1 Building construction — S.P. ARORA & S.P. BINDRA
2 Building Construction Engineering — GURCHARANSINGH
3. Construction, planning equipment & methods. — ROBERT L. PEURIFOY, WILLIAM B . LEDBETTER
4. Building Construction — SUSHIL KUMAR
5. Learning from failures — R.N. RAIKAR
6. Durable structure through planning for preventive measures — R.N. RAIKAR
7. Diagnosis and Treatment structure in Distress — R.N. RAIKAR
8. Building structures — JAMES ABROSE.
9. Standard handbook of civil engg. — Gurcharansingh
10. Building construction — B.C. Punmia
11. Building construction — S.C. Rangwala
12. Civil Engineering Practice (I,II,III) — Kaushik, Asawa & Ahuja
13. Services in Building Complex — V.K.Jain
14 Civil Engineering Construction — Antill & Ryan
15 Pile Foundations — Tomlinson
16 Dharatikamp & Navnirman Manviya Technology Forum (In Gujarati) Earthquake special,
17. Relevant IS codes/Building codes ,NBC.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN TRANSPORTATION ENGINEERING

SEMESTER- VI

Subject Name: Traffic Engineering – II
Subject Code: 2366001

Sr. No.	Subject Content	Total Hrs.
1	**Basic Traffic Flow Characteristic** 1.1 Speed-Flow, Speed-Density, Flow-Density Curves and relations.	2
2	**Highway Capacity** 2.1 Importance of capacity, 2.2 Level of Service concept 2.3 Factors affecting level of service and capacity 2.4 Capacity of freeways, expressways, multilane highways, urban streets and signalized intersection 2.5 Merging – Diverging Flow, Weaving Flow calculations	6
3	**Traffic Control and regulation** 3.1 Signs classifications, maintenance, 3.2 Pavement markings, traffic island 3.3 Off street and on street parking control 3.4 Traffic control at intersection	4
4	**Signal control at intersection** 4.1 Classification of signals 4.2 Basic requirement of signals 4.3 Phasing of traffic signals 4.4 Signal Cycle Time Calculations 4.4.1 Signals coordination	8
5	**Environmental Impact of Traffic** 5.1 Air Pollution 5.2 Noise Pollution	4
6	**Parking** 6.1 Parking problems 6.2 Ill effects of parking 6.3 Zoning and parking space requirement 6.4 Design standards for on street parking 6.5 Off street parking facilities	4
	Total	28

Reference Books:

1. Traffic Engineering and Transport Planning — Kadiyali L.R
2. Highway Engineering — Khanna S.K., Justo C.E.G.,
3. Traffic Planning and Design — S.C. Saxena
4. Principles of Transportation Engineering — Partho Chakraborty and Animesh Das
5. Highway Capacity Manual — Transportation Research Board, Washington D.C.,1997, 2000.
6. Traffic Engineering; Theory and Practice — L.J.Pingnataro,
7. Traffic System Analysis for Engineering and Planners — M.Wohl and B.V.Martin
8. Traffic Flow Theory and Control — D.R.Drew
9. Traffic Engineering — W.R.McShane, R.P.Roess and E.S.Prassas
10. Highway Traffic Analysis and Design — R.J.Salter,

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN TRANSPORTATION ENGINEERING
SEMESTER- VI

Subject Name: Traffic Engineering – II Practice
Subject Code: 2366002

Sr. No	Test/ Practical/Tutorials	Total Hrs.
1	Traffic speed-flow-density relationship by field observations and finding Capacity & Level of service of highway section.	4
2	Stopped delay & Travel time delay Study on Signalised Intersection.	6
3	Saturation flow measurement at Signalised Intersection	4
4	Design of signal for Isolated Intersection	6
5	Design of co-coordinated signals.	3
6	Design of on Street Parking / Parking plot	5
	Total	28

Field work:
Identification of problematic spots for traffic flow and suggesting suitable remedial measures. Its presentation with seminar.

Field visit:
A visit to Full cloverleaf junction or any other important traffic infrastructure.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN TRANSPORTATION ENGINEERING

SEMESTER- VI

Subject Name: Pavement Design and Evaluation
Subject Code: 2366003

Sr. No.	Course Content	Total Hrs.
1	**Types Of Pavement** 1.1 Flexible pavement 1.2 Rigid pavement 1.3 Runway Comparison of pavements	2
2	**Analysis of Flexible Pavement structures** 2.1 Theory and Analysis	5
3	**Analysis of Rigid Pavement structures** 3.1 Theory and Analysis 3.2 Stresses due to temperature 3.3 Stresses due to loading 3.4 Combined Stresses due to Temperature and loading	5
4	**Design of Flexible Pavement** 4.1 Tyre pressure 4.2 other factors, 4.3 ESWL 4.4 Various Methods For Flexible Pavement Design	15
5	**Design of Rigid Pavement** 5.1 EWLF • Other Factors • Various Methods For rigid pavement Design Design Of Joints, Temperature stresses etc	15
	Total	42

Reference Books:

1. Principles of Transportation engineering by Partha Chakroborty & Animesh Das
2. Highway Engineering by S.K.Khanna and C.E.G.Justo, Nem chand Bros. Roorkee
3. Highway Engineering by S.P.Bindra Dhanpat Rai & Sons, Delhi Asia Publishing House ,Delhi
4. Highway Engineering By L.R.Kadiyali
5. Highway Engineering by S.C. Rangwala
6. Transportation Engineering Vol. I & II By Vazirani & Chandola
7. Principles of pavement Design, E.J.Yoder and M.W.Witczak John Wiley and Sons, New York, 1975
8. . IRC– 37, 2001, IRC – 58-1998.
9. Relevant IRC, BIS, AASHTO and PCA Specifications and Guidelines

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN TRANSPORTATION ENGINEERING

SEMESTER- VI

Subject Name: Pavement Design and Evaluation Practice
Subject Code: 2366004

PRACTICALS: 28 hours

- Plate Bearing Test
- Field CBR Test
- Pavement Evaluation By Benkelman Beam Method,
- Road Unevenness Measurement By Bump Integrator
- Tutorials on Design Of Flexible and Rigid Pavement

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN ENGINEERING

SEMESTER- VI

Subject Name: Highway Construction and Maintenance
Subject Code: 2366005

Sr. No.	Course Content	Total Hrs.
1	**Introduction** 1.1 History of road construction 1.2 Equipment used in highway construction 1.3 Stages of construction	2
2	**Highway Construction** 2.1 Seasonal limitations of pavement Construction 2.2 Earthwork 2.3 Stabilization of soil 2.4 Bituminous pavement construction 2.5 Cement concrete pavement construction 2.6 Emulsified bituminous mix 2.7 Pre coating of aggregates 2.8 Recycling of bituminous pavement	16
3	**Surface and Subsurface Drainage** 3.1 Surface drainage 3.2 Subsurface drainage 3.3 Discussion on drainage consideration	6
4	**Highway Construction in Desert, Swampy, Hilly Area** 4.1 Special cases of Pavement construction	6
5	**Maintenance of Road** 5.1 Introduction 5.2 Distresses in pavement 5.3 Functional evaluation of pavement 5.4 Structural evaluation of pavement 5.5 Pavement maintenance 5.6 Maintenance management	12
	TOTAL	42

Text Books /Reference Books:

(1) Principles of Transportation engineering by Partha Chakroborty & Animesh Das

(2) Highway Engineering by S.K.Khanna and C.E.G.Justo, Nem chand Bros. . Roorkee.

(3) Walker And Martin. Asphalt Pavement Engg.

(4) 3.Kerbs And Walker, Highway Materials

(5) 4.HMSO, Soil Mechanics For Road Engineers

(6) 5.HMSO, Bituminous Materials For Engineers

(7) 6.MOST Standard for Highway constructions

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN TRANSPORTATION ENGINEERING
SEMESTER- VI

Subject Name: Project - II
Subject Code : 2366006

(A) Visit to an important traffic infrastructure.

(B) Project

In General The Projects Are Of Following Types

(i) Geometric Design
-Sight Distance Requirements
-Vehicle Cornering
-Horizontal and Vertical Alignments

(ii) Traffic Flow and Queuing Theory
-Traffic Stream Parameters and Relationships
-Models of Traffic Flow
-Queuing Theory and Traffic Flow Analysis

(iii) Highway Capacity and Level of Service Analysis
-Level of Service Concept
-Basic Freeway Segments
-Multilane Highways
-Two-lane Highways

(iv) Traffic Control and Analysis at Signalized Intersections
-Basic Signal Control
-Probabilistic Arrivals
-Traffic Signal Timing
-Signal coordination

(v) Travel Demand and Traffic Forecasting:
-Trip Generation
-Mode and Destination Choice Models
-Highway Route Choice Models

(vi) Environmental Impact of Traffic
-Air Pollution
-Noise Pollution

(vii) Parking

-Parking problems
-Parking design
-Parking management

(viii) Material Testing

-Soil testing
-Aggregate testing
-Bituminous material testing

(x) Transportaion planning

-trip generation
-trip distribution
-modal split analysis
-trip assignment techniques
-Land use planning

(xi) Traffic Surveys

-O-D surveys
-Volume count survey
-Travel time , Saturation and delay study
-Speed studies
-Accident studies

(xii) Pavement Design

-Flexible pavement design
-Rigid pavement design

Note: Project work should consist of following activities;

(i) Survey work
(ii) Planning an designing
(iii) Preparation of drawings
(iv) Report writing