GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM
COURSE TITLE: TRAFFIC ENGINREERING
(COURSE CODE: 3360607)

Diploma Programme in which this course is offered	Semester in which offered
Civil Engineering	Sixth

1. RATIONALE

With the growth of economy and population, numbers of vehicles on roads are increasing exponentially. It has therefore become necessary to study the traffic pattern and accordingly design traffic system which is efficient, comfortable and safe to use and economical to built. This course is therefore introduced to provide insight regarding safety of the road users and proper regulation of traffic flow on multi-lane urban roads. Traffic Engineer should understand the basics of design of signals, intersection and regulations. It is also important to understand proper methods of traffic survey and traffic management techniques. This course attempts to impart knowledge and skills of various traffic control devices to students. It is also necessary for students to learn about safety measures taken during design of the roads for prevention of accidents. Thus this course is an important course for civil engineers working in transportation sector.

2. COMPETENCY :

The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competencies.

- **Determine the traffic requirements for road design after conducting the traffic surveys.**
- **Prepare traffic management plan for highways and urban roads.**

3. COURSE OUTCOMES (COs):

The theory should be thought and exercises should be carried out in such a manner that students are able to acquire different learning out comes in psychomotor and affective domain to demonstrate following course out comes.

i. Conduct various types of Traffic survey.
ii. Select and design the traffic sign.
iii. Synchronise the traffic signal design by using the new technology.
iv. Apply the traffic control aids and norms.
v. Explain causes of road accident, prevention and traffic management.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
3	0	2	5	70	30	20	30	150

Legends: L - Lecture; **T -** Tutorial/Teacher Guided Student Activity; **P -** Practical; **C -**Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

5. COURSE CONTENT DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit—I Introduction to Traffic Engg. and Administration.	1a.Describe Traffic engineering and its functions	1.1 Growth of Traffic engineering , its function and measure for operation of traffic 1.2 Schematic flow chart of Traffic engineering in Transportation department and city
Unit—II Traffic Surveys	2a.Explain types of volume count. 2b. Illustrate various type of Forms require in count method. 2c. Describe O and D survey. 2d. Conduct O and D survey. 2e. Describe parking survey and its methods.	2.1. Types of Volume count and its purposes, Uses 2.2 Equipment used in various count methods. 2.3 Necessity of O and D survey and its methods. 2.4 Analysis and presentation of Data. 2.5 Need and methods of parking survey.
Unit—III Road Signs and Pavement Markings	3a. Describe Traffic sign and General principle of traffic signage. 3b. Explain types of Roads Marking and its Importance.	3.1 Importance, Necessity and General principle of traffic sign. 3.2 Difference types of traffic sign as per IRC Standard and requirement. 3.3 Function and types of road marking, general principles of longitudinal pavement marking, materials and colour. 3.4 Marking of various line such as Centre line, Carriage width, Reduction, Pavement Edge line, Obstruction marking, Stop line, Pedestrian crossing &pedestrian marking and Lay out of a signalised Junction.
Unit—IV Traffic Signals.	4a. Describe importance of traffic signals . 4b. Design traffic signals for given intersection of road 4d. Explain co-ordinated control of signal.	4.1 Traffic signals, Phasing and Advantages and disadvantages of traffic signals. 4.2 Fixed time signals, vehicle Actuated signals. 4.3 Compute signal cycle time by Fix time cycle, Trail cycle, Approximate, Webster's and IRC method and sketch timing diagram for each face. 4.4 Need and Objective for co-ordinated control s, Types of co-ordinated signal.

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit—V Traffic control Aids, Street Furniture and Traffic Regulations.	5.a Explain traffic control Aids and norms of street furniture design. 5.b Describe principles of traffic Regulations.	5.1 Various traffic Aids, Road way Delineator, Hazard markers, Object markers 5.2 Speed breakers, Rumble strips, Guard rail, Safety barriers. 5.3 Traffic Attenuators and Litter Bins. 5.4 Need and Scope of traffic regulations, Traffic law and Regulation speed.
Unit—VI Road Accidents: Causes and Prevention.	6.a Describe Road accidents, Collision diagram and Condition diagram. 6.b Describe Traffic Management measures.	6.1 Objectives of road Accident study 6.2 Causes of road Accident 6.3 Preventive measure for accident 6.4 Reporting and Recording of an Accident 6.5 Collision diagram and Condition diagram. 6.6 Traffic management measure and their Influence in accident prevention 6.7 Legislation, Law Enforcement, Education and propaganda

6 SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to Traffic Engineering and Administration.	6	2	4	4	**10**
II	Traffic Surveys	6	2	4	4	**10**
III	Traffic Controls and Road marking.	8	2	6	6	**14**
IV	Traffic Signals	6	2	4	4	**10**
V	Traffic control Aids and Street furniture, Regulation.	8	2	6	6	**14**
VI	Road Accidents, Causes and Prevention.	8	2	4	6	**12**
	Total	**42**	**12**	**28**	**30**	**70**

Legends: R = Remember**; U =** Understand; **A =** Apply and above levels (Bloom's revised taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7 SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills **(outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

***Note**: Here only outcomes mainly in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of **Course Outcomes** related to affective domain. Thus over all development of **Programme Outcomes (**as given in a common list at the beginning of curriculum document for this programme) would be assured.*
Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

S. No.	Unit No.	Practical/Exercise/Project (outcome in psychomotor domain)	Approx. Hours Required for Practical	Approx. Hours Required for Project
1	I	Draw flow chart of Traffic engineering organization in transportation department of city.	2	0
2	I	Carry out O-D survey for given area.	2	4
3	II	Perform Traffic volume study at given Intersection.	4	4
4	III	Draw various traffic signs.	4	
5	III	Draw the various type of Road marking.	4	0
6	IV	Compute signal cycle time by any method from given data.	4	0
7	V	Draw the sketches of given traffic control Aids.	3	0
8	VI	Draw the Collision and condition diagrams.	3	0
7	VI	Seminar on any aspect of the traffic engineering	2	0
		Total	**28**	**8**

NOTE: Project work has to be carried out on two Saturdays.

8 SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities like: Course/topic based seminars, internet based assignments, teacher guided self-learning activities, course/library/internet/lab based mini-projects etc. These could be individual or group-based.

9 SPECIAL INSTRUCTIONAL STRETEGIES (If any)

i. Depute students to help traffic police for control of traffic movements at an intersection.
ii. Show video clips of nearby road with traffic movements and discuss the shortcomings in the road design
iii. Show picture clips/photographs of Road accidents and discuss the features of road system design which could have prevented such accidents.
iv. Arrange expert lectures by traffic system designers.
v. Ask students to perform traffic survey of busy parts of city in groups and to suggest measures for improvement.

10. SUGGESTED LEARNING RESOURCES:

A. BOOKS :

Sr. No.	Title of Books	Author	Publication
1	Traffic Engineering and Transportation planning	L R Kadiyali	Khanna Publishers. Delhi
2	Traffic planning and design	S C Saxsena	Dhanpat Rai & Sons Delhi
3	Transportation Engineering Vol. I & II	V N Vazirani & S P Chaondola	Khanna Publishers. Delhi
4	Traffic Engineering: Theory and practice.	L J Pingnataro	Prentice Hall, Englewood
5	Principles of Transportation Engineering.	Chakraborty, Partho and Animesh Das	P H I Learning
6	Highway capacity manual	Transportation Research Board	Washington D C

B. List of Recommended I.S. Publications:

i. IRC Special Publications (SP) on Highway Engineering
ii. Standard Specifications and Code of Practice for Road Bridges

C. List of Major Equipment/Materials/Models

i. Working models of traffic junction
ii. Models of various signal system

D. List of Software/Learning Websites

i. www.nptel.ac.in
ii. www.aboutcivil.org.
iii. www.tecmagazine.com
iv. www.ite.org
v. www.transport**engineer**.org
vi. embarqindiahub.org/sites/.../Presentation-Traffic-Engineering
vii. https://origin.library.constantcontact.com
viii. www.infrastructure.gov.in

11 COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

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