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ROAD TRAFFIC ENGINEERING **Course Code : 315318**

Programme Name/s	**: Civil Engineering/ Civil & Rural Engineering/ Construction Technology/ Civil & Environmental Engineering/**
Programme Code	**: CE/ CR/ CS/ LE**
Semester	**: Fifth**
Course Title	**: ROAD TRAFFIC ENGINEERING**
Course Code	**: 315318**

I. RATIONALE

Transportation is backbone of our country. For smooth flow of traffic without any congestion, Traffic engineering is an important aspect of road transportation. Due to the abundant growth in population and infrastructure development, there is urgent need for proper planning, management and designing. similarly, on street parking and off street parking on road and road side is also very important to improve the road dynamics including safety of vehicle users as well as pedestrians. Relevant legislations also play important role to improve traffic regulation and rules for smooth and safe flow of traffic. This course is expected to develop basic knowledge of performing various traffic surveys, analysis and interpretation of the data and provide the solutions for smooth flow of traffic.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Manage the traffic flow condition effectively and efficiently in the given locality.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Analyze the traffic characteristics for the given road pattern.
- CO2 - Undertake relevant types of traffic surveys for the identified situation.
- CO3 - Design the typical parking pattern for the given area.
- CO4 - Justify the need of lighting along with arboriculture for given road section.
- CO5 - Suggest the preventive measures to avoid accidents.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme											
				Actual Contact Hrs./ Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		Total Marks
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
315318	ROAD TRAFFIC ENGINEERING	TEN	DSE	4	-	2	-	6	2	3	30	70	100	40	25	10	25#	10	-	-	150

Total IKS Hrs for Sem. : Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be

declared as "Detained" in that semester.

3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 10 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the necessity of traffic management in the given locality. TLO 1.2 Describe the characteristics of road users in the given situation. TLO 1.3 Describe the vehicular characteristics for the given road section. TLO 1.4 Signify the importance of the road characteristics for the given road condition. TLO 1.5 Determine reaction time of driver in the given situation.	**Unit - I Fundamentals of Traffic Engineering.** 1.1 Traffic engineering- Definition, objects, scope` 1.2 Road user's characteristics-physical, mental, emotional factors. 1.3 Vehicular characteristics-width, length, height, weight, speed, efficiency of breaks. 1.4 Road characteristics-gradient, curve of a road, design speed, friction between road and tyre surface. 1.5 Reaction time-factors affecting reaction time. PIEV Theory.	Lecture Using Chalk-Board Presentations Video Demonstrations
2	TLO 2.1 Clarify the use of terms such as, "Speed, journey, Time and Delay Studies" in traffic survey. TLO 2.2 Collect traffic volume count data for the given road section. TLO 2.3 Analyze the data collected for origin-destination studies of the given road. TLO 2.4 Evaluate spot-speed study data collected for the given road. TLO 2.5 Explain the term, "ITS (Intelligent Transport system)" with its application. TLO 2.6 Suggest the relevant measure/s to control the Urban Traffic conditions in the given situation.	**Unit - II Traffic Surveys and Intelligent Transport system** 2.1 Introduction and Use of Speed, journey, Time and Delay studies. 2.2 Traffic volume count data-representation and analysis of data. 2.3 Necessity of O-D study and its methods. 2.4 Speed studies, spot speed studies and its presentation. 2.5 ITS and Its application. 2.6 Difficulties in Urban Traffic conditions and measures to meet the problems.	Lecture Using Chalk-Board Presentations Video Demonstrations
3	TLO 3.1 Justify the need of parking in the given area. TLO 3.2 Undertake the relevant type of survey for parking purpose in a given locality. TLO 3.3 Explain the impact of unplanned parking TLO 3.4 Compute the parking space requirement in the given area using IRC	**Unit - III Parking studies** 3.1 Need of parking survey and common terms. 3.2 Types of Parking Survey. 3.3 Parking Problems, ill Effects of parking. 3.4 Parking Space Requirement as per IRC standards. 3.5 On-street parking facilities and layout. 3.6 Off-street parking facilities and	Lecture Using Chalk-Board Presentations Video Demonstrations

Sr.No	Theory Learning Outcomes (TLO's)aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
	standards. TLO 3.5 Draw layouts of different On-street parking for given locality. TLO 3.6 Propose the relevant Off-street parking pattern for the given locality. TLO 3.7 Justify the necessity of Parking regulation.	methods. 3.7 Need for Parking regulation and its types.	
4	TLO 4.1 Design the street lighting system for the given road section. TLO 4.2 Suggest the relevant type of trees for road side plantation based on the given criteria to increase the visibility. TLO 4.3 Justify the need of protecting the road side plantation. TLO 4.4 Describe the methods of protecting the road side plantation.	**Unit - IV Street lighting and Arboriculture** 4.1 Street lighting –definition, sources necessity, types-luminaire, foot candle, lumen, factors affecting their utilization and maintenance. 4.2 Factors affecting visibility at night. 4.3 Arboriculture- definition, objectives, factors affecting selection of type of trees. 4.4 Maintenance of trees-protection and care of road side trees	Lecture Using Chalk-Board Presentations Video Demonstrations
5	TLO 5.1 Explain the types of collision occurring during road accident. TLO 5.2 Explain the causes of accident occurred on the given road section. TLO 5.3 Suggest preventive measures to avoid the accidents on the given road section TLO 5.4 Interpret the given symbol employed in collision condition diagram. TLO 5.5 Suggest preventive measures used for Pedestrian safety. TLO 5.6 Explain the relevant legislation related to road user’s safety.	**Unit - V Road Accident Studies** 5.1 Road Accidents-Definition, Types-Collision and non-collision accidents. 5.2 Causes of accidents. 5.3 Measures to prevent road accidents. 5.4 Collision and condition diagram 5.5 Considerations regarding Pedestrian safety. 5.6 Legislation and law enforcement, education and propaganda.	Lecture Using Chalk-Board Presentations Video Demonstrations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare a report on Road user’s and Vehicular characteristics for any existing road.	1	*Identification of road traffic characteristics for any existing road.	2	CO1
LLO 2.1 Analyze the measured traffic volume at an intersection in peak hours (Morning & Evening).	2	Traffic volume analysis for the given section of road.	2	CO2
LLO 3.1 Prepare a report on analysis of the relevant data collected during O-D study with a brief Description report on factors affecting trip generation.	3	*Analysis of the relevant data with a brief report on Factors affecting trip generation.	2	CO2

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Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 4.1 Determine the percentile speed graphically based on measured data of the spot speed on corridor of given road way.	4	*Determination of percentile speed using the distribution of spot speeds data.	2	CO2
LLO 5.1 Conduct the parking survey for institute campus with your recommendations on improvement of parking system.	5	Carry out parking survey and prepare a report on vehicle parking systems.	2	CO3
LLO 6.1 Observe the traffic and parking behavior at a crowded area to identify the relevant issues to be addressed.	6	*Analysis of Local Traffic and Parking Behavior in a Crowded Area.	2	CO3
LLO 7.1 Prepare a site visit report on the existing street lighting system of any two types of roads in your area.	7	Field visit to observe Existing Street Lighting Systems.	2	CO4
LLO 8.1 Identify the existing type of trees to suggest relevant maintenance required.	8	*Identification of type of tree on a given road to suggest relevant maintenance strategy.	2	CO4
LLO 9.1 Draw a collision diagram with a labelled sketch for the point of conflicts on the basis of the observation made at a busy intersection.	9	Field visit to an intersection to identify the point of conflicts.	2	CO5
LLO 10.1 Prepare the report on the Field visit to an intersection to identify Causes of Accidents and required Preventive Measures.	10	*Field visit to an intersection to identify Causes of Accidents and required Preventive Measures.	2	CO5

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Assignment

- Write criteria for application of speed limits of 50,65,80 and 100kmph.
- Identify the criteria for provision of grade separated intersection.
- Explain pedestrian crossing design.
- Prepare a chart of Parking Space Requirement as per IRC standards.
- Download road safety audit form(A-1) and find causes and intensity of accident.
- Illustrate uniform motor vehicle Act.1988 for traffic regulation.
- These are the optional activities for extra learning of students.

Micro project

- Perform traffic survey of busy road junction of city in groups and to suggest measures for improvement.
- Illustrate the technique shifting of trees while widening of road.
- Prepare a report on ITS (Intelligent Traffic Survey) in any three countries.
- Identify the any three method of the planting, protecting and maintaining the trees along the road.
- Prepare a model of any three traffic controlling devices.
- Prepare a report on advanced Vehicle Control System(.IVHS)

- These are the optional activities for extra learning of students.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- For courses with no SLA component the list of suggestive microprojects / assignments/ activities are optional, faculty may encourage students to perform these tasks for enhanced learning experiences.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computer system (Any computer system with basic configuration) Drawing board with accessories	All
2	Drawing board with accessories.	All
3	LCD Projector with accessories	All
4	Measuring tape.	All
5	Line Dori, white wash, brush	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Fundamentals of Traffic Engineering.	CO1	4	0	8	0	8
2	II	Traffic Surveys and Intelligent Transport system	CO2	10	4	8	6	18
3	III	Parking studies	CO3	10	4	8	6	18
4	IV	Street lighting and Arboriculture	CO4	8	0	8	4	12
5	V	Road Accident Studies	CO5	8	2	0	12	14
Grand Total				**40**	**10**	**32**	**28**	**70**

X. ASSESSMENT METHODOLOGIES/TOOLS

Formative assessment (Assessment for Learning)

- Two-unit tests of 30 marks each will be conducted and average of two-unit tests considered. For formative assessment of laboratory learning 25 marks. Each practical will be assessed considering appropriate % weightage to process and product and other instructions of assessment.

Summative Assessment (Assessment of Learning)

- Pen and Paper Test (Written Test),Term Work, Practical examination.

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XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	2	1	3	2	1	2			
CO2	2	3	2	2	2	2	2			
CO3	2	2	2	2	2	2	2			
CO4	2	1	1	1	3	2	2			
CO5	2	1	2	2	2	2	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Dr.L.R.Kadiyali	Traffic Engineering and Transport Planning	Khanna Publishers, Delhi, 2001, ISBN:10: 8185240779;
2	Arora, N. L.	Transportation Engineering	Khanna Publishers, Delhi, 1996, ISBN: 81-7319-0933,
3	Vazirani, V N Chaondola, S P	Transportation Engineering Vol. I & II	Khanna Publishers. Delhi, 2016 ISBN: 9780128038185; 9780128038895
4	Saxsena, S C	Traffic planning and design	Dhanpat Rai & Sons Delhi, 2016 ISBN-10: 8123915500
5	Khanna S.K., Justo, C E G and Veeraragavan, A.	Highway Engineering	New Chand and Brothers, Rookie, 2010, ISBN 978-8185240800

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://archive.nptel.ac.in/courses/105/101/105101008/	Fundamentals of Traffic Engineering and Traffic Surveys
2	https://www.youtube.com/watch?v=G7qU7HOw9QA	Fundamentals of Traffic Engineering
3	https://www.scribd.com/doc/216984580/nptel-ceTEI-L38	Parking studies
4	https://www.youtube.com/playlist?list=PLCC59953860B62145	Road Accident Studies
5	https://archive.nptel.ac.in/courses/105/105/105105215/	Traffic engineering
6	https://www.youtube.com/results?search_query=spot+speed+study+traffic-engineering+nptel	Spot speed studies
7	https://www.youtube.com/watch?v=U46xKnQjfnI&list=PLXkUO1gJka5Ly7H99lILMdJw415xZoBvR&index=2	Traffic stream and traffic volume

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Sr.No	Link / Portal	Description
8	https://www.youtube.com/watch?v=WSxdh50iZpU	Road arboriculture

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 24/02/2025 **Semester - 5, K Scheme**