

DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	M. Tech. (Transportation Engineering and Management)		
Course Title	HIGHWAY TRAFFIC ANALYSIS AND DESIGN		
Course Code	CE601	No. of Credits	3
Course Code of Pre-requisite subject(s)	None		
Session	July 2021	Section (if, applicable)	N.A.
Name of Faculty	Dr. S. Moses Santhakumar	Department	Civil Eng
Email	moses@nitt.edu	Telephone No.	9842450011 (M) 3155 (O)
Webpage	https://sites.google.com/view/s-moses		
E-mail		Telephone No.	
Course Type	<input type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Elements of Traffic Engineering - road user, vehicle and road way and driver characteristics. - Design speed, volume. Passenger Car Units - Static and Dynamic- Highway capacity and level of service - capacity of urban and rural roads - Road user facilities - Parking facilities - Cycle tracks - Pedestrian facilities.</p> <p>Traffic volume studies, origin destination studies, speed studies, travel time and delay studies, Parking studies, Accident studies. Big data – collection and analysis.</p> <p>Elements of design - Alignment - Cross sectional elements - Stopping and passing sight distance. Horizontal curves - Vertical curves. Design problems. Traffic regulation and control - Signs and markings - Traffic System Management.</p> <p>Design of intersections – At-grade intersections- Principles of design – Channelization - Design of rotaries - Traffic signals - pre-timed and traffic actuated. Design of signal setting - phase diagrams, timing diagram – Signal co-ordination – Area traffic Control System. Grade separated interchanges - Geometric elements for divided and access controlled highways and expressways.</p>			

Traffic Safety – Principles and Practices – Safety along links - Safety at intersections. Road Safety Audit – Countermeasures, evaluation of effectiveness of counter-measures– Road safety programmes. Traffic Impact Assessment.

Reference books:

1. ITE Hand Book, *Highway Engineering Hand Book*, Mc Graw - Hill.
2. AASHTO *A Policy on Geometric Design of Highway and Streets*.
3. Pignataro, L.J., *Traffic Engineering – Theory & Practice*, John Wiley.
4. R. J. Salter and N. B. Hounsel, *Highway Traffic Analysis and Design*, Macmillan Press.
5. Relevant IRC codes.

COURSE OBJECTIVES

- To understand the concepts of highway capacity
- To be aware of various methods of collecting traffic data
- To understand the basics of highway planning and design, and workout problems in design of road geometrics
- To learn the principles of intersection design
- To learn the importance of road safety.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Ability to apply the concept of capacity	a b h
2. Skill to conduct traffic surveys	a d f
3. Capability to design the highway geometrics	a b c e g i
4. Capability to design the intersections	a b c e g i
5. Ability to build safety into every aspect of design	a b c e g i j

COURSE PLAN – PART II

COURSE OVERVIEW

To understand the principles of highway planning and design, and workout problems in design of highway geometrics.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1	<ul style="list-style-type: none">• Syllabus and course content• Elements of Traffic Engineering• Road user, vehicle and roadway• Driver characteristics	<ul style="list-style-type: none">• Digipad
2	Week 2	<ul style="list-style-type: none">• Design speed• Passenger Car Units - Static and Dynamic• Highway capacity and level of service	<ul style="list-style-type: none">• Digipad
3	Week 3	<ul style="list-style-type: none">• Traffic volume studies• Manual and Automatic• Speed studies• Spot speed• Journey speed	<ul style="list-style-type: none">• Digipad
4	Week 4	<ul style="list-style-type: none">• Travel time and delay studies• Moving observer method – Problem• Origin destination studies• Home interview and Roadside interview	<ul style="list-style-type: none">• Digipad
5	Week 5	<ul style="list-style-type: none">• Parking studies - Parameters• Parking supply and demand• On-street Parking• Off-street Parking, Multistorey parking systems	<ul style="list-style-type: none">• Digipad• PPT
6	Week 6	<ul style="list-style-type: none">• Accident studies• Accident analysis• Factors affecting accidents	<ul style="list-style-type: none">• Digipad
7	Week 7	<ul style="list-style-type: none">• Cycle Test I	

8	Week 8	<ul style="list-style-type: none"> • Geometric design • Alignment • Cross sectional elements • Stopping and overtaking sight distance - Problems 	<ul style="list-style-type: none"> • Digipad • Problems
9	Week 9	<ul style="list-style-type: none"> • Horizontal curves • Design of all elements - Problems • Vertical curves 	<ul style="list-style-type: none"> • Digipad • Problems
10	Week 10	<ul style="list-style-type: none"> • Traffic regulation and control • Signs and markings • Traffic System Management 	<ul style="list-style-type: none"> • Digipad • PPT
11	Week 11	<ul style="list-style-type: none"> • Design of intersections • Types of At-grade intersections • Principles of Channelization 	<ul style="list-style-type: none"> • Digipad • PPT
12	Week 12	<ul style="list-style-type: none"> • Design of rotaries • Warrants • Elements of rotaries • Design problem • Mini-roundabout 	<ul style="list-style-type: none"> • Digipad • PPT • Problems
13	Week 13	<ul style="list-style-type: none"> • Cycle Test II 	
14	Week 14	<ul style="list-style-type: none"> • Traffic signals • Pre-timed vs traffic actuated • Webster's design • Design problem 	<ul style="list-style-type: none"> • Digipad • Problems
15	Week 15	<ul style="list-style-type: none"> • Grade separated interchanges • Design elements • Typical layouts • Examples from other countries 	<ul style="list-style-type: none"> • Digipad • PPT
16	Week 16	<ul style="list-style-type: none"> • Traffic Safety • Safety along links • Safety at intersections • Forgiving highways 	<ul style="list-style-type: none"> • PPT
17	Week 17	<ul style="list-style-type: none"> • Road Safety Audit • Principles and practices • Countermeasures ----- QUIZ ----- 	<ul style="list-style-type: none"> • PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test 1	Week 7	1 hour	20
2	Cycle Test 2	Week 13	1 hour	20
3	Quiz	Week 17	0.5 hours	10
4	Assignment 1	Design and drawing		10
5	Assignment 2	Write-up		10
CPA	Compensation Assessment*	Week 17	1 hour	20
6	Final Assessment *	Week 18	2 hours	30

***mandatory**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

It is proposed to take feedback from the students, at the end of the semester to evaluate the execution of the course.

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)**MODE OF CORRESPONDENCE (email/ phone etc)**

1. **Email on** moses@nitt.edu
2. **Phone on** 9842450011 (M) or 3155 (O)
3. **Whatsup on** 9842450011

COMPENSATION ASSESSMENT POLICY

Compensation Assessment will be administered (at the end of the course) to those students who had missed Cycle Test 1 or 2 for valid reasons. The portions for Compensation Assessment will be the combined portions for Cycle Tests 1 or 2.

The students who wish to appear for the Compensation Assessment should obtain prior permission from the HoD.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

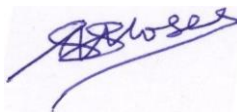
- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

- Grading will be done with normalized score.
- Passing minimum is the maximum of {35% or Class Average/2} and a minimum of 30% should be scored in the final assessment.

FOR APPROVAL



Course Faculty _____

CC-Chairperson  _____

HOD  _____


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