



DEPARTMENT OF CIVIL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech, Civil Engineering		
Course Title	TRAFFIC ENGINEERING AND SAFETY		
Course Code	CEPE19	No. of Credits	3
Course Code of Pre-requisite subject(s)	CEPC20	Semester	VI
Session	Jan. 2020	Section (if, applicable)	
Name of Faculty	Dr. S. Moses Santhakumar	Department	Civil Engineering
Official Email	moses@nitt.edu	Telephone No.	9842450011
Name of Course Coordinator(s) (if, applicable)	NA		
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Traffic stream characteristics: Road user, vehicle and highway characteristics, Fundamental parameters and relations of traffic flow, Traffic stream models. Speed data collection and analysis, Density and travel time measurement and analysis, Moving Observer Method, Automated Traffic Measurements - Traffic forecasting and growth studies. Capacity and level of services of roads. Pedestrian studies – flow characteristics - Design principles of pedestrian facilities.</p> <p>Traffic Management: Parking studies – parking statistics, parking surveys, parking requirements - on street and off street parking. Lay-byes and bus stops. Principles of Traffic Control: Basics of traffic management. Traffic Signs, Road Markings. Traffic System Management – speed, vehicle, parking, enforcement regulations. Mixed traffic regulations – one way, tidal flow, turning restrictions etc.</p> <p>Design of Intersections for Safety: Uncontrolled intersection, Conflicts at intersection, Channelization, Traffic islands, Design of median islands, turning vehicle templates. Traffic intersection control: Traffic Rotaries – design of traffic rotaries. Traffic signal design - Design Principles of Traffic Signal, Coordinated Traffic Signal, Vehicle Actuated Signals and Area Traffic Control. Design of Grade Separated Intersection - trumpet, diamond, cloverleaf and flyovers.</p> <p>Accident Investigation and Prevention: Characteristics of road accidents, causes of accidents: road – driver – vehicle - environment, Significance of accident data, Accident recording and analysis - Crash reporting and collision diagrams - Statistical Interpretation and Analysis of Crash Data. Identification of potential sites for treatment - Safety countermeasures. Monitoring and evaluation. Roadway lighting.</p>			



Road Safety Audit – Overview, stages of road safety audit, audit process, checklists, and elements of good road safety audit. Highway safety improvement program - Safety Education, Traffic Law Enforcement. Road Safety Management System. Case studies.

References

1. Khanna, S. K., Justo, C. E. G. and Veeraragavan A., *Highway Engineering, Nem Chand and Bros, Roorkee, 2014.*
2. Kadiyali, L. R., and Lal, N. B., *Principles and Practices of Highway Engineering, Khanna Publishers, 2008.*
3. *IRC SP: 88 – 2010*
4. Rune Elvik, Alena hoye, Truls Vaa and Michael Sorensen, *The handbook of Road Safety Measures, Emerald Group Publishing Limited, 2009*
5. *ITE, Highway Safety Manual, ITE, 2010*

COURSE OBJECTIVES

1. To understand the fundamentals of traffic stream characteristics
2. To learn the skills of traffic control and management
3. To learn the methods of safe intersection design
4. To learn the importance and methods of accident investigation and prevention
5. To understand the concepts of road safety audit and safety improvement methods

MAPPING OF COs with POs

Course Outcomes On completion of the course, the students will be able to:	Programme Outcomes (PO) (Enter Numbers only)
1. Carry out traffic surveys	a b d e i
2. Implement traffic system management	a b c e g i
3. Carry out intersection design for safety	a b c e g i
4. Record and analyse accident data and suggest countermeasures	a b c e g i
5. Carry out road safety audit	a b c e g i j

COURSE PLAN – PART II

COURSE OVERVIEW

To understand the principles of traffic engineering and design for road safety.



COURSE TEACHING AND LEARNING ACTIVITIES			
			(Add more rows)
S.No.	Week	Topic	Mode of Delivery
1	Week 1	<ul style="list-style-type: none"> Syllabus and course content Traffic stream characteristics Road user, vehicle and highway characteristics Fundamental parameters and relations of traffic flow 	<ul style="list-style-type: none"> Chalk and Board Tutorials
2	Week 2	<ul style="list-style-type: none"> Traffic stream models Speed data collection and analysis Density and travel time measurement and analysis Moving Observer Method 	<ul style="list-style-type: none"> Chalk and Board
3	Week 3	<ul style="list-style-type: none"> Automated Traffic Measurements Traffic forecasting and growth studies Capacity and level of service of roads Pedestrian studies 	<ul style="list-style-type: none"> Chalk and Board
4	Week 4	<ul style="list-style-type: none"> Traffic Management Parking studies Parking parameters, parking surveys and parking requirements On street and off street parking 	<ul style="list-style-type: none"> PPT
5	Week 5	<ul style="list-style-type: none"> Principles of Traffic Control Basics of traffic management Traffic Signs Road Markings 	<ul style="list-style-type: none"> PPT
6	Week 6	<ul style="list-style-type: none"> Traffic System Management Speed, vehicle, parking and enforcement regulations Mixed traffic regulations One way, tidal flow and turning restrictions 	<ul style="list-style-type: none"> PPT
7	Week 7	<ul style="list-style-type: none"> Cycle Test I 	



8	Week 8	<ul style="list-style-type: none"> • Design of Intersections for Safety • Uncontrolled intersections • Conflicts at intersections • Channelization 	<ul style="list-style-type: none"> • PPT
9	Week 9	<ul style="list-style-type: none"> • Traffic islands • Design of median islands • Traffic Rotaries – principles and elements • Design of traffic rotaries and capacity 	<ul style="list-style-type: none"> • PPT
10	Week 10	<ul style="list-style-type: none"> • Traffic signal design • Phase diagrams • Saturation flow and Cycle time calculation • Coordinated Traffic Signals 	<ul style="list-style-type: none"> • Chalk and Board • Tutorials
11	Week 11	<ul style="list-style-type: none"> • Vehicle Actuated Signals and Area Traffic Control • Design of Grade Separated Interchanges • Trumpet and diamond Interchanges • Cloverleaf and directional Interchanges 	<ul style="list-style-type: none"> • PPT
12	Week 12	<ul style="list-style-type: none"> • Accident Investigation and Prevention • Characteristics of road accidents • Causes of accidents • Road – driver – vehicle - environment 	<ul style="list-style-type: none"> • Chalk and Board
13	Week 13	<ul style="list-style-type: none"> • Cycle Test II 	
14	Week 14	<ul style="list-style-type: none"> • Significance of accident data • Accident recording and analysis • Crash reporting and collision diagrams • Statistical Interpretation and Analysis of Crash Data 	<ul style="list-style-type: none"> • Chalk and Board



15	Week 15	<ul style="list-style-type: none"> • Identification of potential sites for treatment • Safety countermeasures • Monitoring and evaluation • Road Safety Audit 	<ul style="list-style-type: none"> • PPT
16	Week 16	<ul style="list-style-type: none"> • Overview and stages of Road Safety Audit • Audit process and checklists • elements of good road safety audit • Highway safety improvement program 	<ul style="list-style-type: none"> • PPT
17	Week 17	<ul style="list-style-type: none"> • Safety Education • Traffic Law Enforcement • Road Safety Management System • Case studies 	<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	1.5 hours	20
2	Cycle Test 2	Week 13	1.5 hours	20
3	Assignment 1	Off-Street Parking		5
4	Assignment 2	Road Safety Audit		5
CPA	Compensation Assessment*	Week 17	1.5 hours	20
5	Final Assessment *	Week 18	3 hours	50

***mandatory; refer to guidelines on page 4**

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 (including compensation assessment to be specified)

Attendance:

- The closing date of attendance for the subject is Week 14
- 100% attendance is desirable for every student, with minimum being 75%
- Attendance during each assessment is mandatory and submission of assignments as per schedule is compulsory.
- Compensation assessment will be given to only those students that have missed the mid-term assessment on genuine grounds.
- The portions of the retest will include all portions covered till that date.

Marks:

- Passing minimum of mid-term assessment + assignment + class exercises + final assessment would be as per institute norms
- The passing minimum shall be 35% or (class average/2) whichever is greater.

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, IF ANY

The faculty is available for consultation during office hours at room number ____ of Civil Engineering department
Queries, if any, can also be emailed to the faculty using the email ID mentioned in the first page

FOR APPROVAL

Course Faculty _____

CC- Chairperson _____

HOD _____



Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

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2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.