

DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech. (Civil Engineering)		
Course Title	HIGHWAY AND PAVEMENT ENGINEERING		
Course Code	CEPC20	No. of Credits	3
Course Code of Pre-requisite subject(s)	Nil		
Session	July 2022	Section (if, applicable)	A & B
Name of Faculty	Dr. Sunitha V	Department	Civil Engineering
Email	sunitha@nitt.edu	Telephone No.	9443302930
Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Highway Planning: Different modes of transportation, Characteristics of Road Transportation, Highway Development in India, Classification of Roads, Network patterns. Principles of highway alignment – requirements and controlling factors. Engineering surveys for alignment - conventional and modern methods. Typical cross sections of Urban and Rural roads - cross sectional elements.</p> <p>Highway Geometric Design: Factors affecting geometric design. Sight distance - stopping sight distance, overtaking sight distance, sight distance at intersections. Design of horizontal alignment - super elevation, widening of pavements, transition curves. Design of vertical alignment - gradients, summit and valley curves.</p> <p>Traffic Engineering: Road user, vehicle and traffic characteristics – Speed, volume, parking and accident studies. Concepts of PCU, capacity and level of service. Traffic signs and road markings - objectives, classification and uses. Principles of design of at-grade intersections – channelized, rotary and signal intersections. Introduction to grade separated intersections.</p> <p>Pavement Materials and Design: Desirable properties of subgrade soil, road aggregates and bituminous materials - Pavement components and their functions - Factors influencing the design of pavements - Design principles - Design of flexible and rigid pavements as per IRC.</p> <p>Pavement Construction and Maintenance: Stabilization Techniques, Construction of gravel, WBM, bituminous and cement concrete roads. Pavement failures - Types and causes of failures in flexible and rigid pavements. Maintenance of highway pavements. Strengthening of existing pavements - evaluation, overlay design. Recycling of pavements.</p>			

COURSE OBJECTIVES			
<ul style="list-style-type: none"> To understand the importance of transportation, characteristics of road transport, highway planning, alignment and surveys To know the geometric design of highways To study the traffic characteristics and principles of intersection design To know about the pavement materials and design To understand the pavement construction, distresses in pavements and maintenance options 			
COURSE OUTCOMES (CO)			
Course Outcomes			Aligned Programme Outcomes (PO)
<ul style="list-style-type: none"> Carry out surveys involved in planning and highway alignment 			a, b, c, d, r, l
<ul style="list-style-type: none"> Design sight distances, horizontal and vertical alignments 			a, b, c, d, e, g, h, l
<ul style="list-style-type: none"> Carry out traffic and intersection studies. 			a, b, c, d, j, l
<ul style="list-style-type: none"> Determine the characteristics of pavement materials and design of flexible and rigid pavements 			a, b, c, d, e, f, g, h, j, l
<ul style="list-style-type: none"> Measure and analyse distresses and recommend maintenance strategies 			a, b, c, d, f, g, l
COURSE PLAN – PART II			
COURSE OVERVIEW			
The course gives overall view of the highway planning, geometric design, traffic engineering concepts, pavement engineering and tests on pavement materials.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1	Introduction, modes of transportation, Characteristics of Road Transportation	PPT
2	Week 2	Highway Development in India, Classification of Roads, highway alignment	PPT
3	Week 3	Engineering surveys for alignment - cross sectional elements of Roads	PPT
4	Week 4	Geometric Design - Sight distance	C&B, PPT, Tutorial
5	Week 5	Horizontal alignment - super elevation, widening of pavements, transition curves	C&B, PPT, Tutorial
6	Week 6	Vertical alignment - gradient, summit and valley curves	C&B, PPT, Tutorial

7	Week 7	Road user, vehicle and traffic characteristics - Speed, volume, parking and accident studies	PPT
8	Week 8	PCU, capacity and level of service. Traffic signs and road markings	PPT
9	Week 9	At-grade intersections and grade separated intersections.	C&B, PPT, Tutorial
10	Week 10	Pavement material properties - Pavement components - Design principles	PPT
11	Week 11	Design of flexible pavements as per IRC, IITPAVE demonstration	C&B, PPT, Tutorial
12	Week 12	Design of rigid pavements as per IRC	C&B, PPT, Tutorial
13	Week 13	Stabilization Techniques	PPT
14	Week 14	Road Construction	PPT
15	Week 15	Failures in pavements. Maintenance, Strengthening and Recycling of pavements	PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment 1	Week 10	1 ½ hour	25
2	Assessment 2 (Quiz)	Week 16	1 hour	20
3	Assignment/Tutorial/Design	Every classes	--	15
CPA	Compensation Assessment	Week 17	1 ½ hour	25
5	Final Assessment	Week 19	3 hours	40

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

The Feedback form will be collected from the students in Week 13.

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)
sunitha@nitt.edu, 9443302930

COMPENSATION ASSESSMENT POLICY

1. Attending all the assessments including submission of all assignments are MANDATORY for every student.
2. If any student is not able to attend Assessment-1 due to genuine reason, student is permitted to attend the compensation assessment with 20% weightage. The portion for such compensation assessment will be portion of Assessment-1.
3. At any case, compensation assessment will not be considered as an improvement test.

GRADING: Grading should be as per the Institute norms. Passing minimum is 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

FOR APPROVAL

Course Faculty		CC-Chairperson		HOD	
	Dr. Sunitha V		Dr. R. Manjula		Dr. G. Swaminathan