

Branch Name:	Transportation Engineering
ProgramCode:	ET211
CourseName:	Advances in Transportation Engineering
CourseCode:	2ET2110204T
Pre-requisiteCourse:	Highway Construction Materials

Course Objective:

1. To explain different graphical methods and statistical software packages useful in transportation engineering field.
2. To illustrate the use of probability and discrete distributions in transportation engineering problems.
3. To explain different statistical methods used in transportation engineering problems, measures of central tendency, correlations methods.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
5	3	2	-	5	24	60	16	40	-	-	-	-	100

Sr.No.	Topics	Teaching Hrs.	Module Weightage
1	Intelligent Transportation System (ITS): Introduction, Advanced Traveler Information Systems; Advanced Traffic Management System, Transportation Network Operations; Commercial Vehicle Operations and Inter- modal Freight; Public Transportation Applications; Smart vehicles, Smart highways, Adaptive Traffic Control System, Incident management, Automatic Vehicle Identification and Classification, Vehicle Positioning System, Collision Warning System, Driverless vehicles, Electronic Toll Collection, ITS and road-pricing. ITS and regional strategic transportation planning, including regional architectures: ITS and safety, ITS and security, ITS as a technology deployment program, research, development and business models, ITS and sustainable mobility, travel demand management.	20	45%
2	High Performance Highway Construction Materials: Introduction, Use of waste materials: Fly ash, Slag, Recyclable waste, Other waste materials. Modified bituminous materials: PMB, EMB, NRMB, CRMB, IS requirements and testing procedures. Modified Bitumen Emulsion and tests, Multi grade bitumen, Anti stripping additives, Microsurfacing: procedure, testing. Superpave: Binder specifications, Aggregates and testing, mixing, Gyratory Compactor. High performance mixes: Stone Matrix Asphalt (SMA), fibers, mix design. Porous Asphalt: mix, advantages. Fiber Reinforced Concrete: Steel, asbestos, glass, polymer, carbon, natural fibers, applications. High Performance Concrete: introduction, advantages, IS requirements, mineral admixtures, applications.	20	45%
3	Advanced Machineries in Pavement Construction/ Smart Roads/ Equipment	5	10%

References Books:

Course Learning Outcomes:

1. Able to use appropriate statistical method in transportation engineering problems.
2. Capable of applying the rule of probability and discrete distributions in solving problems.
3. Able to apply the knowledge of optimization technique and use statistical software in analysis of transportation engineering problems.

Practical:

1. Development of logic/algorithms for different ITS applications.
2. Tests on modified bituminous materials

3. Tests on modified bituminous mixes
4. Tests on fiber reinforced concrete

Open Ended Problems:

Field Visit:

- 1 Visit to BRTS and any other places where ITS is applied. Visit to Hot mix plant where modified bituminous materials or mixes are used. Visit to Microsurfacing application.
- 2 Visit to road construction site where Fly ash is used. Visit to road construction site where Fiber Reinforced Concrete or High Performance Concrete is used.

Course Learning Outcomes (CLO):

After successful completion of the course the students shall be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Able to use appropriate statistical method in transportation engineering problems.	L-3, L-4, L-5
CLO2	Capable of applying the rule of probability and discrete distributions in solving problems.	L-2, L-3, L-4, L-5, L-6
CLO3	Able to apply the knowledge of optimization technique and use statistical software in analysis of transportation engineering problems.	L-1, L-2, L-3

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with Pos & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1		M		H	M				M			M		M	M
CLO2	M	H	H		M		H			M		M	H	M	M
CLO3	H		M		L	M	M	M				M	M	H	M

H: High, M: Medium, L: Low