

Branch Name:	Transportation Engineering
ProgramCode:	ET211
CourseName:	Pavement Design and Construction
CourseCode:	2ET2110201T
Pre-requisiteCourse:	Construction and Evaluation

Course Objective:

1. To study the different types of pavements (highway and airfield) depending upon the mode of transportation, use and structural behaviour.
2. To study the various types of structural responses (stresses and deformations) inducing the pavements due to wheel load and other climatic variations.
3. To study the various methods of analysis and design of the pavements and its subsequent applications to the various types of pavements.

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

Sr.No.	Topics	Teaching Hrs.	Module Weightage
1	Types of Pavements – Rigid, Flexible, Highway-Runway Comparison.	3	5%
2	Stresses in Flexible Pavements – Theories, Analysis.	5	10%
3	Stresses in Rigid Pavements – Theories, Analysis.	5	15%
4	Design of Flexible Pavements –ESWL, Tyre Pressure, Other Factors, Various Methods for Highway and Runways Design, Mix Designs – Bituminous Mixes, Admixtures, Marshall Stability Test, Results, Control.	10	20%
5	Design of Rigid Pavements – EWLF, Other Factors Various Methods for Highways and Runways, Design of Joints, Temperature stresses. Pre-stressed Concrete Pavements.	10	20%
6	Highway Construction Methods: Embankment, Sub- Base, Base and Surface Courses, Flexible Pavements, Rigid Pavements. Materials for road construction, Specification and tests, Macadam construction, surfacing and surface treatment, Road Work in Desert, Swampy, Hilly Area in Problematic Situation.	7	20%
7	Surface and Subsurface Drainage.	5	10%

References:

1. E.J.Yoder and M.W.Witczak, Principles of Pavement Design, John Wiley and Sons, New York, 1975
2. Tang, Pavement Design
3. Sharma & Shrama, Principles and Practice of Highway Engg. 4. IRC– 37, 2001, IRC – 58-2000.
5. Y.H.Huang, Pavement Analysis and Design. Prentice Hall, Englewood Cliffs, New Jersey, USA, 1993, ISBN-0-13-655275-7
6. H.N.Atkins, Highway Construction and Maintenance, Soils, and Concretes, Reston Publishing Company, Reston VA, 1983.
7. J.P.Watson, Highway Construction and Maintenance, Longman Scientific and Technical, New York, 1989.
8. Relevant IRC, BIS, AASHTO and PCA Specifications and Guidelines.

9. Kadiyali L.R. and Lal, N. B., Principles & Practice of Highway Engineering, Khanna Publishers, Delhi.
10. Khanna S.K., Justo C.E.G., Highway Engineering, Nem Chand & Bros., Roorkee.
11. Partho Chakraborty and Animesh Das, Principles of Transportation Engineering, PHI
12. F. L. Mannering, W. P. Kilareski and S. S. Washburn, Principles of Highway Engineering and Traffic Analysis. Wiley India Pvt. Ltd., New Delhi.

Course Learning Outcomes:

1. Understand the structural actions involved in the pavement due to different types of load acting thereon and the various methods of analysis of pavements.
2. Understand the various aspects of the construction of concrete roads and low volume roads.
3. Understand the pavement management system and quality control and assurance criteria and subsequently, its application in the highway construction.

List of Tutorials:

1. Problems based on analysis for Flexible and Rigid pavement.
2. Tutorials based on design of Flexible Pavements for Highway and Runway.
3. Tutorials based on design of Rigid Pavements for Highway and Runway.
4. Tutorials based on design of Overlays.
5. Tutorials based on the pavement evaluation and strengthening.

Course Learning Outcomes (CLO):

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the structural actions involved in the pavement due to different types of load acting thereon and the various methods of analysis of pavements.	L-1, L-2
CLO2	Understand the various aspects of the construction of concrete roads and low volume roads.	L-2, L-3, L-4, L-5, L-6
CLO3	Understand the pavement management system and quality control and assurance criteria and subsequently, its application in the highway construction.	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	L	M		M		L	M	M	M	M
CLO2		M	H	M		M	H			M			M	M	H
CLO3	H	M		M	L		M		H			M	M	H	M

H: High, M: Medium, L: Low