

ADVANCED PAVEMENT MATERIALS

Offering Branches	CE	Credits:	3
Course Category:	HONOURS	Lecture-Tutorial-Practical:	3-0-0
Course Type:	Theory	Continuous Evaluation:	30
Prerequisites:	20CE3306 – Surveying 20CE3502 – Highway Engineering	Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Identify different pavement materials.	K1
CO2	Focus on the subgrade soil and stabilization concepts.	K4
CO3	Explain physical properties of aggregates and recycled aggregates	K4
CO4	Examine the functions and applications of geosynthesis	K3
CO5	Describe the functions and applications of advanced materials	K1

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1			2			1	1					1	2	
CO2			2			3	3					3	2	
CO3			3			3	3					3	3	
CO4			2			2	2					2	2	
CO5			2			1	1					1	2	
Avg.			2			2	2					2	2	

1- Low

2-Medium

3-High

Course Content

UNIT-1	Introduction to Pavement Materials: Pavement structure; introduction to materials used in different layers; factors affecting pavement performance; need for material characterization; performance data collection; specification development.	CO1
UNIT-2	Subgrade Soil and Stabilization: Characterization of subgrade soil for pavement design: index properties, compaction characteristics; stiffness and strength of soil, resilient modulus (Mr); deformation characteristics of subgrade soil; soil Stabilization concepts	CO2
UNIT-3	Aggregates: Origin, physical characterization of aggregates; requirement of aggregate property in different pavement layers; aggregate gradations; aggregate packing characteristics; factors affecting the performance of unbound aggregate layers, recycled aggregates and Marginal aggregates in pavement construction.	CO3
UNIT-4	Geosynthesis: An overview on the development, functions and applications of various geosynthetics - the geotextiles, geogrids, geonets, geomembranes, geocomposites and other products.	CO4
UNIT-5	Advanced Materials: An overview on the development, functions and applications of various like flyash, quarry dust, brick ash, rice husk dust, GGBS etc.,	CO5

Learning Resources

Text Books	<ol style="list-style-type: none"> Highway Engineering, (9th edition) by Khanna, S.K. and Justo ,C.E.G., Nem Chand Bros, Roorkee, 2010. Pavement Design and Materials, Papagiannakis, A.T., Masad, E.A., Wiley, 2008, First Edition. Fundamentals of Geosynthetics Engineering, Sanjay Kumar Shukla and Jian-Hua
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	<p>Yin, CRC Press, 2017, 1st edition.</p> <p>4. Designing with geosynthetics, Koerner, R.M., Pearson Education Inc., 2012, 6th edition</p>
Reference Books	<p>1. Asphalt Binder Handbook, MS-26, Asphalt Institute, 2011, First Edition.</p> <p>2. Asphalt Mix Design Methods, MS-2, Asphalt Institute, 2015, Seventh Edition.</p> <p>3. Geosynthetics Engineering: in Theory and Practice, Mandal, J.N., Research Publishing, Singapore, 2018, 1st ed.</p> <p>4. IRC Code for flexible pavement – IRC – 37 -2001.</p> <p>5. IRC Code for Rigid pavement – IRC – 58 – 2002.</p> <p>6. IS:16352-2020: Testing of HDPE Geomembrane liners.</p>
e- Resources & other digital material	<p>5. https://nptel.ac.in/courses/ 105/101/105101143</p> <p>3. https://nptel.ac.in/courses/ 105/101/105101176</p>