

Pavement Analysis and Design

Course Code	Credit Hours
CE-422	2-1

Course Description

This course introduces students with basic elements and features of pavement engineering. It covers pavement material characterization, pavement structural analysis and design, pavement construction, pavement recycling and rehabilitation.

Text Book:

1. Yang H. Huang, (2003), Pavement Analysis and Design, 2nd Edition (or latest), Pearson Higher Education.
2. Principles of Transportation Engineering by Partha Chakroborty & Animesh Das (1stEdn)
3. Course Pack has been prepared based upon the reference material.

Reference Book:

1. Transportation Engineering by Ashford and Wright
2. Transportation Planning and Traffic Engineering, Edited by C. A. O'Flaherty (1stEdn)

Prerequisites :

Nil.

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
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Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assessment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Introduction to Pavement Engineering Types of Pavements, Pavement Design Approaches, Pavement Design Standards
2	Types, materials and functions of base, subbase, and wearing course
3	Asphalt Binder Characterization, Asphalt Mixture Design using Marshall Method,
4	Introduction to SHRP and Superpave Mix Design
5	Flexible pavement structural analysis, Influence of Axle Configuration and Loading on the Damaging Effect, Contact Area between the Tire and Road
6	Design of flexible pavement structures using AASHTO design procedure, Determination of ESALs, KENLAYER Software
7	Rigid pavement structural analysis, Westerguard Method
8	Design of Rigid pavement structures. KENSLAB Software
9	Mid Semester Exam
10	Construction of Roads and Plant/Equipment
11	Mechanistic-Empirical Pavement Design Method, Introduction to MEPDG Software
12	Applications of AI in Highway Asset Performance Monitoring and Evaluation
13	Pavement Failures, Construction and Maintenance
14	Pavement Evaluation and Rehabilitation, Introduction to Non-destructive Testing
15	Pavement Recycling and Reclaimed Asphalt Pavement (RAP)
16	Pavement Drainage System and Design, Introduction to DRIP Software

17-18	End Semester Exam
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Practical

Experiment No	Description
1	Aggregate Gradation Test
2	Impact Value of Aggregates
3	Los Angles Abrasion Test
4	S G & Absorption Test of Coarse Aggregates
5	Shape Test of Aggregates
6	Lab CBR Test
7	Penetration test of bitumen
8	Ductility test of bitumen
9	Softening point test of bitumen
10	Flash and fire point test of bitumen.
11	Viscosity test for bituminous materials
12	Marshall stability and flow test