Jordan University of Science and Technology
Faculty of Engineering
Civil Engineering Department

CE 442 Pavement Materials and Design I

Textbooks

Y. H. Huang, Pavement Analysis and Design, Prentice Hall, 2nd Edition, 2004.

References

1. Association of State Highway and Transportation Officials (AASHTO) Specifications and Guides, 2002.
2. N. J. Garber and L. A. Hoel, Traffic and Highway Engineering, Thomson Learning, Inc., 2002.
3. E. J. Yoder and M. W. Witczak, Principles of Pavement Design, John Willey, Inc., 1975.
4. F. L. Roberts, P. S. Kandhal, E. R. Brown, D-Y Lee, and T. W. Kennedy, Hot-Mix Asphalt Materials, Mixture Design and Construction, 2nd Edition, NAPA Research and Education Foundation, 1996.
5. R. Horonjeff and F. X. Mckelvey, Planning and Design of Airports, McGraw Hill, Inc., 4th Edition, 1994.
6. The Asphalt Institute (AI) Superpave Series No. 2 (SP-2), Superpave Mix Design, 1996.
7. The AI Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types, 1996.
8. The AI Manual Series No. 2 (MS-10), Soil Manual, 5th 1996.
9. The AI Manual Series No. 4 (MS-4), The Asphalt Handbook, 7th Edition, 2007.

Prerequisites

Prerequisites by topic	The students must have a basic knowledge in transportation engineering.
Prerequisites by course	Surveying CE 345
Co-requisites by course	
Prerequisite for	-

Topics Covered

Week	Topics
1-2	Introduction: terminology, types of Pavements, etc.
3-4	Soils and Base Materials in Pavement Design
5	Superpave Aggregate Tests
6	Asphalt Binder Testing and Evaluation
7	Superpave Asphalt Binder Tests
8	Marshall Mix Design Method
9-10	ESALs Calclulation, Design of Flexible Pavements
11-13	Flexible Pavement Distress, Performance, Response, and Analysis
14	Design of Rigid Pavements
15	Rigid Pavement Distress, Performance, Response, and Analysis

Evaluation

Assessment Tool	Expected Due Date	Weight
Homework & Quizzes	One week after homework problems are assigned	5%
Participatation	Entire semester	5%
First Exam	According to the department schedule	25 %
Second Exam	According to the department schedule	25 %
Final Exam	According to the University final examination schedule	40 %

Objectives and PIs

Course Objectives	Performance Indicators
CO-1: Understand different pavement types, terminology, and concepts.	**(a)PI3:** Students are able to apply knowledge of engineering
CO-2: Understand the engineering properties and characteristics of the different materials that concern the pavement engineer.	**(a)PI1:** Students are able to apply knowledge of mathematics and physics **(a)PI2:** Students are able to apply knowledge of science **(a)PI3:** Students are able to apply knowledge of engineering
CO-3: To be familiar with the Superpave asphalt binder and aggregate tests and specifications	**(j)PI2:** Students are able to show awareness of current practices in the civil engineering discipline **(k)PI2:** Students are able to use modern engineering tools for engineering practice
CO-4: To design flexible and rigid pavements using the AASHTO design procedure	**(c)PI1:** Students are able to design a component to meet certain constraints **(c)PI2:** Students are able to design a system to meet certain constraints
CO-5: To conduct analysis of flexible (and rigid) pavements for stresses, strains, and deflections.	**(a)PI1:** Students are able to apply knowledge of mathematics and physics **(a)PI2:** Students are able to apply knowledge of science **(a)PI3:** Students are able to apply knowledge of engineering

Contribution of Course to Meeting the Professional Component

The course furnish the student with basic understanding of pavement types, components, and to be able to design both flexible and rigid pavement using AASHTO design method. Flexible Pavement Distress, Performance, Response, and Analysis. Rigid pavement performance and analysis are also presented in less details than flexible pavement.

Relationship to Program Outcomes (%)

A	B	C	D	E	F	G	H	I	J	K	L
30		30							10	10	

Relationship to Civil Engineering Program Objectives

PEO1	PEO2	PEO3	PEO 4
√	√	√	√