

Pavement Design CE 411 and CE 511

Instructor: John Zaniwski, ESB 651c, Office hours: TR 10:00 to 12:00

Text: Optional *Pavement Analysis and Design*, Huang, second edition, other reading assignments will be made.

Prerequisites: CE 351 Meeting ESB-E G78A, TR 5:00 – 6:15

Objective: There are over 2.2 million miles of highways in the United States and over 10,000 airports. In West Virginia there are over 34,000 miles of roadways and 120 airports. The WVDOH resurfaced about 1,500 miles of roads last year. The objective of this course is to prepare engineers to perform pavement designs for new construction and rehabilitation of existing highways and airports.

Prerequisite: MAE 243

Elective course for BSCE

Expected Learning Outcomes - Upon successful completion of this course students will:

Goals by topic	student outcome
Understand the importance of pavement to national infrastructure	J
Be able to analyze flexible pavement structures	A
Be able to analyze rigid pavement structures	A
Identify the design factors needed for pavement design and rehabilitation	E
Design a flexible pavement	C
Design a rigid pavement	C
Present design drawings and analysis in a report and on design plans	K

ABET Student Outcomes:

A - An ability to apply knowledge of mathematics, science, and engineering

C - An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

E - An ability to identify, formulate, and solve engineering problems

J - A knowledge of contemporary issues

K - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Assignments: The reading assignments are indicated on the attached sheet. Quizzes may be used to assess preparedness, if you are not in class on the day of a quiz, it is assumed you are not prepared. Homework will be assigned during the semester. All assignments are due at the beginning of class. Late assignments will not be accepted ss. Graduate students (CE 511) will be given special assignments throughout the semester.

Attendance: You are expected to attend all classes. You are expected to come to class on time. If you have a specific problem with attendance notify me prior to class, unless the emergency is such that this is not possible. In the event of an emergency, notify me as soon as possible.

Grading: Final grades will be based on 90%, 80%, 70%... corresponding to A, B, C,... The instructor reserves the right to curve up. Grades will be based on a weighted average: Homework and quizzes 10%, design project 20%, tests 50%, and final 20%

Social justice statement:

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.

Week	Topic	Reading
1	Introduction Pavement Types Pavement performance	1 - 7
2	Stresses in flexible pavements	8 - 10
3	Computer models	
4	Stresses in rigid pavements	11 - 13
5	Computer models	
6	Exam	
7	Traffic Loading	14
8	Material characterization	15, 16
9	Drainage design	17, 18
10	Flexible pavement design	19
11		
12	Rigid pavement design	20
13		
14	Rehabilitation design	
15		
Final exam	12/7/17 8 AM	

1. <https://www.pavementinteractive.org/reference-desk/pavement-types-and-history/pavement-types/>
2. <https://www.pavementinteractive.org/reference-desk/pavement-types-and-history/pavement-types/pcc-pavement/>
3. <http://www.pavementinteractive.org/hma-pavement/>
4. <http://www.pavementinteractive.org/roughness/>
5. <https://www.fhwa.dot.gov/publications/research/infrastructure/pavements/ltpa/reports/03031/03031.pdf>
6. <http://www.pavementinteractive.org/deflection/>
7. <http://www.pavementinteractive.org/skid-resistance/>
8. <http://www.pavementinteractive.org/structural-designpavement-response/>
9. <http://www.pavementinteractive.org/flexible-pavement-mechanistic-models/>
10. <https://www.civil.iitb.ac.in/~kvk Rao/uploads/5/9/3/7/59372049/ce742lec3.pdf>
11. https://www.civil.iitb.ac.in/~kvk Rao/uploads/5/9/3/7/59372049/ce742lec_8_11.pdf
12. Handout
13. <https://www.pavementinteractive.org/reference-desk/design/structural-design/rigid-pavement-response/>
14. <http://www.pavementinteractive.org/loads/>
15. <http://www.pavementinteractive.org/mixture-characterization-tests/>
16. <https://www.pavementinteractive.org/reference-desk/testing/asphalt-tests/hma-performance-tests/>
17. <http://www.pavementinteractive.org/design-factorsdrainage/>
18. <https://www.fhwa.dot.gov/pavement/pubs/009633.pdf>
19. <https://www.pavementinteractive.org/reference-desk/design/structural-design/1993-aashto-flexible-pavement-structural-design/>
20. <http://www.pavementinteractive.org/1993-aashto-rigid-pavement-structural-design/>

more to come