

Washington State University
Department of Civil and Environmental Engineering

CE400 Highway Materials Engineering
Spring 2009

Course Description	Highway Materials Engineering 3 (2-3) Prereq Engl 402; senior standing; certified major in C E or instructor permission. Basic properties and mix designs of aggregates, asphalt, concrete and recycled materials; quality assurance, quality control.
Instructor	Shihui Shen, Sloan 26, 335-7455, sshen2@wsu.edu
TA	Craig Jordan, Sloan, Sloan 24, 335-2437*3, cajordan@wsu.edu
Class Schedule	Class: M, W, 13:10-14:00; Sloan 32. Lab: W, 14:10-17:00, Sloan B15-B17, Sloan B22, and Albrook (concrete lab).
Office Hours	Mon and Wed 2-4pm (or by appointment) – Instructor Tu and Th 3-4pm, Wed 12-1pm – TA
Textbooks	1- “Hot Mix Asphalt Materials, Mixture Design and Construction” Roberts et al. Published by the National Asphalt Association, Lanham MD, 1997. (Required. Provided by instructor at no cost; courtesy of NAPA). 2- “Design and Control of Concrete Mixtures” Published by Portland Cement Association, Skokie IL, 1988. (Required. Provided by instructor at a reduced cost of \$15; courtesy of the Portland Cement Association).
Reference Books	1. Superpave Series No. 1 (SP-1) – Binder Specification and Testing 2. Superpave Series No. 2 (SP-2) – Superpave Mix Design
Course Content	This 3-credit course covers the fundamentals of highway material behavior and testing. It focuses material property evaluation, hot mix asphalt (HMA) mixtures mix design, and Portland Cement Concrete (PCC) material characterization.
Course Web Site	http://pas.ce.wsu.edu/CE400/index.htm
Course Objectives	The overall objectives of this course are that the students when completing this course, will be able to (1) select, specify, and design an asphalt paving mixture for specific climatic and traffic conditions using the SUPERPAVE mixture design system, (2) perform key SUPERPAVE laboratory tests for asphalt binders, aggregates, and mixtures and master the analysis and interpretation of data collected, (3) understand and mathematically describe key fundamental properties of asphalt binders (4) understand and describe the key types, uses, and fundamental properties of Portland cement concrete materials, (5) select, specify, and design a normal concrete paving mixture, (6) perform proportioning, mixing, and strength tests for Portland Cement concrete mixtures, and analyze and interpret the data collected.

Exams

There will be two exams, one midterm exam (tentatively scheduled on Feb. 25, Wednesday) and one final (May 4, 3-5 pm). *No makeup exams will be given!* Please see instructors for emergency.

Grading

- Quiz/In-class exercise: 10%
- Homework: 20%;
- Lab Reports: 15%
- Midterm Exam : 25%
- Final Exam: 30%

Final grade cutoffs will not exceed the following:

A = 91.5%; A- = 89.0%; B+ = 86.7%; B = 83.3%; B- = 80%; C+ = 76.7%; C = 73.3%; C- = 70%; etc...

Class Policy

- Homework/lab reports will be due at the *beginning* of the class period on the assigned due date. *Unexcused late homework/reports will receive a deduction of 15%. Homework/lab reports will NOT be accepted after the solution is posted online.*
- Students will be divided into groups to study the course materials and performance lab testing.
- Each student must submit an individual assignment/lab report unless explicitly instructed to do otherwise. Copying homework and/or lab report are not allowed. Students will be given half of the score if two identical solutions are found.
- Class/lab performance will be considered for the final grades.
- Follow all the safety and etiquette requirements and TA's instruction. Always help TA clean lab before leave. Un-cleaned lab will receive 10% lab grades deduction for the whole group.

List of Labs

1. Physical Properties of Aggregates.
2. Proportioning and Mixing of Portland Cement Concrete.
3. Strength of Portland Cement Concrete Mixes.
4. Viscosity and Aging of Asphalt Binders.
5. Rheological Properties of Asphalt Binders.
6. HMA Mixing, Maximum Specific Gravity, and Asphalt Content Using Ignition Oven.
7. HMA Superpave Gyratory Compaction and Bulk Specific Gravity.
8. Mechanical Properties of HMA.

Students with Disabilities

Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Admin Annex Bldg, Room 217). Please stop by or call 509-335-3417 to make an appointment with a disability specialist.

Academic Integrity

Academic integrity will be strongly enforced in this course. Cheating or plagiarism in any form will not be tolerated. Cheating includes, but is not limited to, copying work or allowing your work to be copied. Plagiarism includes resubmitting previously graded homework or lab reports from a previous semester, even if they were your own work. All incidences of cheating will be reported to the Office of Student Affairs. The first incidence of cheating will result in an F for the course. A second incident of cheating will result in possible dismissal from the University.