

CGN 6905 – Properties and Evaluation of Pavement Materials

Course Objectives: This course is aimed at providing students with technology and theories on evaluation of asphalt materials through combined curriculums including lecture, lab/hands-on session and course project.

The student is expected to:

- Understand plant equipment and process for producing asphalt mixtures;
- Describe procedures for paver operation and asphalt compaction in the field;
- Acquire and use information from long-term pavement performance database;
- Identify laboratory conditioning methods and tests for evaluation of asphalt mixtures;
- Analyze performance of pavement systems using a range of mechanistic-empirical models (e.g., PerRoad, AASHTOWare);
- Determine structural layer coefficient for asphalt materials.

Pre-requisites: CGN 4503/6905 Pavement Design or related courses

Instructor: Jian Zou, Ph.D.
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Email address: zouj@ce.ufl.edu
Office hours: Open-door policy or by appointment

Time and Location: T (01:55 – 02:45 PM), Weil 408A

R (12:50 – 02:45 PM), Weim 1070

- Note: Place for lab (Aggregate/Asphalt Mixture Lab) will be announced before the class.

Textbook: Handouts

Grading:	Homework assignments	50%
	Exam	20%
	Course project	30%

Grading Scale: Letter grades will be determined based on an absolute scale (A=90+, A-=87.5+, B+=85+, B=80+, B-=75+, etc.)

Tentative Course Outline:

Topic	Content
Introduction	<ul style="list-style-type: none"> • Course description; fundamental concepts
Course Project (Title and Abstract) TBA	
Asphalt mixture plant production	<ul style="list-style-type: none"> • Types of asphalt plants • Plant equipment; production process
Asphalt Paving	<ul style="list-style-type: none"> • Preparation for paving • Paver operation • Compaction
Rutting	<ul style="list-style-type: none"> • Long-term pavement performance (LTPP) database • Triaxial test; APA test • Rutting models
Alligator Cracking	<ul style="list-style-type: none"> • Bending beam test • Bottom-up cracking models • Models in PerRoad program
Exam TBA	
Longitudinal Cracking	<ul style="list-style-type: none"> • Laboratory conditioning for asphalt mixtures • Superpave IDT test; CSIC test for top-down cracking • Top-down cracking models • Impact of mixture additives
Reflective Cracking	<ul style="list-style-type: none"> • CSIC test for reflective cracking • Reflective cracking models
Transverse Cracking	<ul style="list-style-type: none"> • Thermal stress restrained specimen test (TSRST); Superpave IDT test for thermal cracking • Thermal cracking models
Mechanistic-Empirical Pavement Design and Evaluation	<ul style="list-style-type: none"> • Dynamic modulus test • Mechanistic-Empirical pavement design guide • Models in AASHTOWare
Course Project (Presentation and Summary Report) TBA	

References: The student is recommended to read notes and the following references as instructed, and come prepared to discuss the material. Class discussion with participation by all, is an integral part of the learning process.

- ABAQUS (2013). Abaqus Analysis User's Guide Version 6.13, Simulia.
- AASHTO (2008). Mechanistic-Empirical Pavement Design Guide, Interim Edition: A Manual of Practice. American Association of State Highway and Transportation Officials, 212 pp.
- Huang, Y.H. (2004). Pavement Analysis and Design, 2/E. Prentice-Hall, New Jersey, 792 pp.
- AI (2001). Principles of Construction of Hot-Mix Asphalt Pavements, MS-22, 2nd Edition, Asphalt Institute, 274 pp.
- Roberts, F.L., Kandhal, P.S., Brown, E.R., Lee, D.Y. and Kennedy, T.W. (1996). Hot Mix Asphalt Materials, Mixture Design, and Construction, National Asphalt Pavement Association Education Foundation, Lanham, MD.

Attendance: It is strongly recommended that the student attend the class as a large portion of the information necessary for the completion of the course is made available throughout both lecture and hands-on session.

Honesty Policy: All students admitted to the University of Florida have signed a statement of academic honesty committing to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted in this course and all others.

Software Use: All faculty, staff and student of the University of Florida are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Accommodation for Students with Disabilities:

Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.

- Career Resource Center, Reitz Union, 392-1601, career and job search services.

Conflict and Resolution:

Students who have conflicts and/or issues with their homework assignment or course project may bring it to the attention of the instructor via email, Canvas or by appointment within 7 days of the in-class distribution of the homework or project. No conflicts will be resolved 7 days after the in-class distribution of the homework or project.

Homework and Assignments:

Graded assignments will be assigned to the students in class and there will be an announcement in Canvas and will be counted toward your final grade. Homework should be neatly and professionally formatted. Please use the format described in the following page.

Homework Format

1. All pages should include your name, class designation (CGN 6905 or Evaluation Pvt), homework number, and the submission date at the top of the sheet.

Evaluation Pvt CGN 6905 HW#1	01-25-2019	Last name, First name	1/2
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2. All homework must be submitted using only one side of the page.
3. Begin each problem with a problem statement of what is being solved.
4. Work should be organized and **neat**. Assumptions should be clearly stated, **appropriate units** should be noted on answers and answers should be boxed, underlined or otherwise **appropriately labeled**. Where appropriate include references to figures, tables or other sources.
5. Where appropriate, neat sketches should be included to explain design calculations or appropriate problems. Straightedges should be used to create lines for graphs, axes and where appropriate.
6. Numerical answers should be given with an appropriate **number of significant digits**.