

## CGN 6905 – Advanced Pavement Design

1. **Catalog Description** – Function and material requirements of different elements of flexible and rigid pavement systems; characterization of soils, materials, traffic loads, and environment for design; flexible and rigid pavement design; new developments.  
Credits: 3
2. **Pre-requisites** – CGN 3501 classification only
3. **Course Objectives** – The student is expected to learn:
  - Basic characteristics of pavement structures
  - Modes of failure for flexible and rigid pavements
  - To analyze stress-distribution throughout multilayer pavements systems
  - To obtain properties for pavement materials – granular & cohesive soils, stabilized granular soils, and asphalt concrete
  - To calculate traffic loads for highway design
  - Fundamentals of pavement design for flexible and rigid pavements
4. **Contribution of Course to Meeting the Professional Component** – This course is part of engineering topics for the curriculum. This course is primarily engineering design with elements of engineering science.
5. **Relationship of Course to Program Outcomes:** This course requires the student to apply basic math, science, engineering and research principles to analyze and design pavement structures and materials
6. **Instructor** - Christopher C. Ferraro, Ph.D.  
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(352) 392-0959  
E-mail address: ferraro@ce.ufl.edu  
Office hours: TBA
7. **Graduate Teaching Assistant** – Jerry Paris  
470 Weil Hall  
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Office hours: TBA
8. **Lecture Meeting Time** 2<sup>nd</sup> period Monday, Wednesday, and Friday
9. **Location** - Florida Gym Room 230
10. **Required Textbook** - Papagiannakis, A.T., and Masad, E.A., (2008) Pavement Design and Materials, John Wiley and Sons, Inc., 542 pp. ISBN 0471214612, 9780471214618
11. **Recommended Reading** – Huang, Y.H. (2004), Pavement Analysis and Design, 2/E Prentice-Hall, New Jersey, 792 pp. ISBN 0131424734  
The student should read the assigned chapter(s) or notes prior to class, and come prepared to discuss the material. Class discussion, with participation by all, is an integral part of the learning process.
12. **Course Outline** - see attached
13. **Attendance and Expectations** – attendance in this course is not mandatory; announced quizzes will be given occasionally during the semester, participation from students during lecture is expected. It is strongly recommended the student attend lecture as a large portion of the information necessary for the completion of the course is be made available during lecture.

14. **Grading** – Homework assignments 10%  
 Exam 1 – 22%  
 Exam 2 – 22%  
 Final Exam – 26%  
 Term Paper/Presentation 20%
15. **Homework and Assignments** – Homework in this course is designed to prepare the student for a professional career in engineering. This is a graduate level course. Homework should be neatly and professionally formatted. Please use the format attached to this syllabus.
- Homework is due at the start of the class period on the day specified., unless otherwise noted
  - Late homework will be accepted at a 25% reduction if turned in within 24 hours after the due date. No credit will be given for HW submitted thereafter. If there are extenuating circumstances with regard to ability to submit an assignment on time, **prior** consent with instructor must be made.
  - All homework must follow the format attached to this syllabus.
  - All graphs should be computer generated and labeled correctly
  - Sample calculations should be clear and easy to follow; preferably, use a math processor (Mathcad, etc.)
  - Illegible homework is subject being rejected by the instructor for grading purposes.
16. **Grading Scale** – letter grades will be determined by the instructor, by listing students' total scores out of 100% from high to low and making grade boundaries at appropriate breaks in the listing.

A	89.995 and above	****NOTE****
A-	87.995 – 89.994	Sakai is used to provide the grade as recorded by the instructor; however for calculation purposes, Sakai may performing
B+	84.995 – 87.994	slight rounding Errors and may NOT accurately reflect your
B	82.495 – 84.994	actual grade. Therefore, Sakai should be used only as for
B-	79.995 – 82.494	grade verification. It is important to note it is possible for a
C+	77.495 – 79.994	“0” to NOT be recorded in Sakai for assignments which have
C	72.495 – 77.494	not been submitted. Sakai does not account for “ungraded”
C-	69.995 – 72.994	assignments, and it is possible that your grade as provided by
D+	64.495 – 69.994	Sakai may be artificially high. It is in your best interest to
D	59.995 – 64.494	create a spreadsheet with the appropriate weighting to
E	<59.994	calculate your course grade.

Information on current UF grading policies for assigning grade points may be found at: <http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades>

17. **Make-up Exam/Quiz Policy - Prior** consent of the instructor or a doctor's certificate of illness is the **ONLY** satisfactory excuse for absence of an exam, quiz or late submission of homework. In such cases a make-up exam will be provided, or other appropriate accommodations will be made
18. **Honesty Policy** – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves 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 and exams taken in this course and all others.

19. **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.
20. **Software Use** – All faculty, staff and student of the University 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.
21. **Calculator Policy for Exams and Quizzes:** The only calculators that are permitted for use during tests are the same as those permitted for the Fundamentals of Engineering Exam, which all civil engineering students are required to take prior to graduation. There are no exceptions to this requirement. The only acceptable models of calculators are listed below. Use of any other calculator during the exam must be approved by the instructor at least 24 hours before the exam.
- Casio: All fx-115 models. Any Casio calculator must contain fx-115 in its model name.*
- Hewlett Packard: The HP33 and HP35s, but no others.*
- Texas Instruments: All TI-30X and TI-36X models.*
22. **Cellular Telephone Policy for Exams and Quizzes:** Cellular telephones are disruptive during class and should be turned off. Cellular telephones must be turned off and stored away (preferably in a book bag) during exams and quizzes. Any student using a cellular telephone during a test will be considered to be in violation with the academic honesty policy and will be subject to disciplinary action.
23. **Conflict and Resolution for Exam, Quizzes and Homework:** Students who have conflicts and/or issues with their exam may bring it to the attention of the professor via email, Sakai or by appointment within 7 days of the in-class distribution of the exam, quiz or homework. No conflicts will be resolved 7 days after the in-class distribution of the exam, quiz or homework.

**Homework Format:**

1. All pages should include your name, class designation (CGN 4503 or Pavement Design), and the date at the top of the sheet.

Pavement Design CGN 6905 HW#1	01-15-2012	Ferraro, Christopher	1/3
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2. All homework must be submitted on engineering computation paper (which may be purchased at the campus store and other locations) 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. *The homework in this class should be submitted to the instructor as though the assignment an engineering project, being submitted to one's boss. Assignments that do not meet a minimum standard of neatness and organization will receive penalties of up to 25%.*
5. Where appropriate, neat sketches should be included to explain design calculations or appropriate problems. Straight edges 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.

### Tentative Course Outline:

Topic	Content	Reference
Introduction	<ul style="list-style-type: none"> <li>• Course Description, Fundamental Design Principles</li> <li>• Pavement Types, Wheel Loads</li> </ul>	Chapter 1 and Course Notes
Flexible and Rigid Pavement Distress	<ul style="list-style-type: none"> <li>• Flexible and Rigid Pavement Distress and its Causes – Design Factors</li> </ul>	Chapter 9
Flexible Pavement Stresses	<ul style="list-style-type: none"> <li>• Load-Induced Stresses in Flexible Pavements</li> <li>• Weslea</li> </ul>	Chapter 2
<b>EXAM 1 TBA</b>		
Traffic	<ul style="list-style-type: none"> <li>• Vehicle and Traffic Characterization for Design</li> </ul>	Chapter 2
Material Characterization	<ul style="list-style-type: none"> <li>• Strength and Deformation Tests, CBR, Resilient Modulus of soil determination, Asphalt Concrete Testing, Superpave, Portland Cement Testing</li> </ul>	Chapters 3,5,6,10 & other material
<b>EXAM 2 TBA</b>		
Flexible Pavement Design	<ul style="list-style-type: none"> <li>• AASHTO Design Procedure</li> </ul>	Chapter 11
Rigid Pavement Stresses	<ul style="list-style-type: none"> <li>• Load-Induced Stresses in Rigid Pavements</li> <li>• Thermal Stresses and Combined Effects of Temperature and Load</li> </ul>	Chapter 8
Rigid Pavement Design	<ul style="list-style-type: none"> <li>• AASHTO Design Procedure</li> </ul>	Chapter 12
<b>FINAL EXAM TBA</b>		