CARLETON UNIVERSITY

Civil and Environmental Engineering Department
CIVE5303 Pavement and Materials
Course Outline

Winter 2016 **Instructor: A. O. Abd El Halim**

CLASS: Mackenzie Building ME 3356, Time: 2:35 pm to 5:25, Tuesday

OFFICE: MKz Bldg 2486, phone 520-2600 x 5789, e-mail: a_halim@carleton.ca
Office hours: by appointment

COURSE DESCRIPTION

The objective of the course is to introduce graduate students with an opportunity to understand of the main issues related to the design and construction of asphalt pavement systems. The course refreshes students knowledge on the materials and mix design methods adopted in todays' road design and construction. The students are expected to realize the different stages followed between office and field work related to the different phases of design, construction and maintenance of the pavement with emphasis on the materials and processes. When completing the course, students will gain new skills and Information related to one of the most important civil engineering infrastructure.

An important component of the class is the term paper. Each student is expected to identify a topic related to the course theme and develop a detailed paper addressing a specific issue showing the relationship between the gained skills and knowledge and how it could be applied to analyze and address a specific problem. The term paper is important task to improve both the research skills and technical writing abilities of the graduate students.

COURSE REQUIREMENTS

Class participation	10%
Selection of Topic for Term paper	05%
First Draft of Term paper	10%
Final Term Paper and Presentation	25%
Final examination	50%
Total	***100%***

If there is any student in this course who, because of a disability, may need special accommodations, please let me know and contact the Paul Menton Centre for Persons with Disabilities as soon as possible. Students should also read the graduate calendar regulations, particularly regarding the serious academic offence of plagiarism.

Course Outline

Week 1
Pavement system, Objectives and functions, Main characteristics of the pavement system, Design process overview,

Week 2
Basic Properties of Materials, General Considerations Bituminous Materials Advantages and Disadvantages, Definitions, Bitumen and Binder-Aggregate Adhesion: Bituminous Binders

Week 3 & 4
Superpave Fundamentals, Characterization of Binder Properties, Test Methods and equipment, Test Methods for Performance Grading, Binder Aggregate Adhesion, Binder-Aggregate Coating Characterization, Bitumen-Aggregate Stripping

Week 5 & 6
Hot Mix Asphalt: HMA Materials, Characteristics of Hot Mix Asphalt (HMA), Volumetric Terms, HMA Mix Design, Marshall, Superpave Gyratory, Superpave Mix Design

Week 7
Basic concepts of Equivalent Single Axle Loads (ESAL): Estimate of ESALs considering daily, monthly and seasonal truck flows, Use in PMS and pavement design

Week 8 &9
Design Process Overview: Pavement Purpose, Pavement Significance, Pavement Condition, Pavement Types, Flexible and Rigid. Inputs, Traffic, Climate, Foundation, Analysis, 1993 and 2002 AASHTO Design Guide, Pavement Design, Example

Week 10
Updates on Mechanistic Empirical Pavement Design Guide (MEPDG)
.

Week 11:
Construction considerations, and Quality Control and Quality Assurance

Week 12:
Term paper presentations

Reading Materials

Publications, Journals and Conference Proceedings of the following organizations:
Transportation Research Board (TRB), Canadian Technical Asphalt Association (CTAA), American Association of Paving Technologists (AAPT), International Society of Asphalt pavement (ISAP), Superpave (SHRP), Transportation Association of Canada (TAC), ASCE, CSCE, and any other recognized publications relevant to the subject.