

CARLETON UNIVERSITY
Civil and Environmental Engineering Department
CIVE 5806 / CVG 6301 Advanced Pavement Engineering and Management
Course Outline

Fall 2016

Instructor: A. O. Abd El Halim

CLASS: Mackenzie Building 3190, Time: 11:35 pm to 2:25, W

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 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 management of maintenance and construction of asphalt pavement systems. The course refreshes students knowledge on the design methods and processes of asphalt roads. The students are expected to appreciate the interaction between office and field work related to the different phases of design, construction and maintenance of the pavement with emphasis on the management. 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%
Presentation in Class	20%
Final Term Paper	25%
Final examination	30%
<u>Total</u>	<u>100%</u>

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: Introduction,

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

Week 2: PAVEMENT MANAGEMENT SYSTEMS OVERVIEW:

Provide a historical perspective of the evolution of PMS over the last 20 years, Describe the basic components of a PMS, Discuss how the products are used to aid decision making, current state practice

Week 3: INVENTORY AND HISTORY:

Types of inventory and historical data, Different methods of collecting data, GPR, Drainage, Strip maps, Quality Control

Week4 & 5: PAVEMENT CONDITION SURVEYS

Need for condition surveys, Collection methodologies, Four basic types of condition surveys, AASHTO Draft Protocols, Different procedures and equipment available

Week 6: PAVEMENT CONDITION INDICES

Historic development of pavement condition indices, The basic functions of condition indices in PMS, Different types of

condition indices, Development of a pavement condition index

Week 7: ESAL FLOW MAPS

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: PERFORMANCE MODELS

Understand use of performance models, Identify common modeling approaches, Understand methods for evaluating reliability, Describe requirements for updating models

Week 9: REMAINING SERVICE LIFE

Concept of remaining service life, How remaining service life is used and its importance, How remaining life is calculated

Week 10: PRIORITIZATION

Describe the objectives of a multi-year prioritization analysis, Understand the differences between other multi-year analysis techniques, Describe the components of a multi-year prioritization analysis, Understand the use of a multi-year prioritization analysis as part of an agency's project selection process.

Week 11: OPTIMIZATION

Understand philosophy of optimization, Identify concepts involved in optimization analysis, Identify types of models used in optimization analysis

Week 12: QUALITY MANAGEMENT

Identify the fundamental principles of Total Quality, Become familiar with the application of Quality Management