**Department of Civil and Environmental Engineering**
**CIVE 5806: Advanced Pavement Engineering and Management**

## 1. Course Instructor

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## 2. Teaching Assistants

Information on TA will be posted on D2L

## 3. Course Meeting

Wednesdays, 6:05 to 8:55pm.

## 4. Course Website and Communication

Carleton's D2L website will be used for posting some of the course materials and discussions. You are required to **frequently check the website for updates**. You are also required to check your Carleton e-mail account for e-mails sent to you related to this course.

## 5. 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 infrastructures. 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 analyse 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.

## 6. Course Assessment Plan

| Assessment Scheme | Weight | Important Notes |
|---|---|---|
| **Project 1:**<br>I. Key idea presentation: You will review a technical paper related to advanced pavement engineering, materials, design and management and then present the key idea of the paper including main goal of the paper, method used, and main findings. (1 slide and 3 minutes maximum, Reference of the paper needs to be clearly mentioned in your slide) | *10%*<br>*(An additional 5 marks can be obtained as a bonus for extraordinary presentations)* | • *The student will select her/his own paper. The paper can be a journal article from Canadian Journal of Civil Engineering, Road Materials and Pavement Design, International Journal of Pavement Engineering, ASCE Journal of Materials in Civil Engineering, etc.*<br>• *In each class, 4 to 5 students will be randomly selected.*<br>• *You need to prepare your slide and submit for presentation by Sept 19th in Dropbox on D2L.*<br>• *Top 3 presentations will be selected and declared.*<br>• *Instructor may ask upload pre-recorded presentation instead of in-class* |

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| | | *presentation. Best presentations maybe shared with future students as an encouragement* |
| **Project 2:**<br>I. Presentation on term project/term paper<br>(5 slides, 5 minutes maximum)<br><br>II. Report on term project/term paper<br>(Pages: 5 pages max including references, Font: Times New Roman, Font size 12. If you have charts/graphs, you need to re-draw. Snapshots are not acceptable) | *15%*<br><br>*15%* | • *Ppt is due on Oct 17*<br>• *Presentations start on Oct 18*<br>• *Reports due on Nov 15*<br>• *You need to upload pre-recorded presentation instead of in-class presentation. These presentations will be aired in class. Best presentations maybe shared with future students as an encouragement.* |
| **Homework assignments** | *10%* | • During the semester, several homework assignments will be provided.<br>• Students need to complete them on their own and submit on due time. |
| **Final exam** | *50%* | • *Exam date TBD*<br>• ***A minimum of 50% in the final exam is required to pass the course*** |

## 7. Major Topics

- Lec 1: Course Introduction and Introduction to Pavement System, Engineering and Designs
- Lec 2 and 3: Overview of Flexile Pavement Design: AASHTO 93 Design Method and MEPDG Method
- Lec 4: Overview of Civil Infrastructure System (CIS) and Pavement Network Analysis
- Lec 5 and 6: Life Cycle Assessment (LCA) Methodologies, Life Cycle Cost Analysis (LCCA) Procedures
- Lec 7 and 8: Pavement Management System Overviews, Basic Component of PMS, Pavement Conditions Data, Pavement Conditions Surveys, ASTM Method
- Lec 9 and 10: Pavement Condition Indices and Pavement Performance Models
- Lec 11 and 12: Pavement Maintenance Prioritization and Optimization

## 8. Reading Materials

- Nicholas Garber and Lester Hoel, Traffic and Highway Engineering, 5th Edition, Ch. 19 Flexible Pavement Design, Ch. 21 Pavement Management, Ch. 18 Pavement Materials (Ch. 18 for homework assignment). Estimated cost for the e-book is $75 and the Hardcopy is $350. Not mandatory.
- CIS from InfraGudie of National Research Council of Canada (NRC). Freely available.
- Pavement Network Analysis from Ch. 5 from TAC Pavement Design and Mgmt. Guide. Freely available.
- LCA Methodologies from Ch. 10 from Bradley Striebig Book on Eng. & Sustainable Development. Freely available.
- LCAA Procedures from EUPave and FHWA Guide on LCCA. Free.
- Publications, Journals and Conference Proceedings of the following organizations: Transportation Research Board (TRB), International Society of Asphalt pavement (ISAP), Superpave (SHRP), Transportation Association of Canada (TAC), ASCE, CSCE, and any other recognized publications relevant to the subject.

## 9. Class Attendance

You are strongly recommended to attend all classes. Certain information given in class, e.g., information about the format of examination questions or about the important examination topics, will not be given outside class or posted on course website. Therefore, you may miss certain important information if you do not attend classes. You must arrive in time -- if you arrive late, the instructor and teaching assistants may ask you to leave. If you consistently arrive late, then you may be barred from attending all the

remaining sessions. Students need to attend additional guest lectures provided by industry professionals or experts arranged during the semester. Time of the guest lectures will be discussed in classes.

## 10. Grading Policy

- If you miss an exam/quiz/assessment activity because of unavoidable circumstances, a reasonable accommodation may be made based on university practices. For example, the weight of the missed quiz maybe added to the Final Exam or other reasonable option maybe sought. You have to inform the instructor and provide reasonable and supporting documents/documents presenting evidence within a week of missing the component. Note that the final exam paper will not be returned to students.
- Students are required to complete their work on an individual basis unless specifically stated otherwise. However, discussion and consultation between students is encouraged.
- The instructor determines the content and establishes the grading rules for all assignments, quizzes, final exam, projects/poster/presentation etc. If applicable, the teaching assistant may grade parts of exams and assigned course works. When determining a student's final grade in the course, the instructor will examine the record of each individual student's achievement; the final grade may be adjusted to take into account the compassionate circumstances and the student's general pattern of achievement in the course.

## 11. Academic Integrity and Professional Conduct

Students are expected to conduct themselves in all aspects of the course at the highest level of academic integrity. Any student found to commit academic misconduct will be dealt with according to the Faculty/University practices. More information is available at https://carleton.ca/registrar/academic-integrity/ and https://carleton.ca/registrar/wp-content/uploads/Academic-Integrity-Policy.pdf

## 12. Accommodation

"The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable)"