CIVL 312 – Pavement Design and Analysis

CIP Code: 15.0201
For assistance determining CIP Code, please refer to this webpage
or reach out to Sarah Todd at todds@canton.edu

Created by: Aksel Seitllari, PhD, PE
Updated by: Aksel Seitllari, PhD, PE
A. TITLE: Pavement Design and Analysis

B. COURSE NUMBER: CIVL 312

C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):
   # Credit Hours: 3
   # Lecture Hours 2 per Week
   # Lab Hours _2 per_ Week
   Other ___ per Week

   Course Length (# of Weeks): 15

D. WRITING INTENSIVE COURSE: No

E. GER CATEGORY:
   Does course satisfy more than one GER category? If so, which one? None

F. SEMESTER(S) OFFERED: (Fall, Spring, or Fall and Spring) Spring

G. COURSE DESCRIPTION: This course covers the structural design of flexible and rigid pavements. Considerations include traffic and environmental conditions, performance measures and failure mechanisms, surface characteristics, joints, and drainage.

H. PRE-REQUISITES: CONS 280 Civil Engineering Materials, or permission of the instructor.
   CO-REQUISITES: None
## I. STUDENT LEARNING OUTCOMES:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>PSLO</th>
<th>GER</th>
<th>ISLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Differentiate between flexible, rigid, and composite pavements based on engineering properties and pavement response</td>
<td>ABET SO 1</td>
<td></td>
<td>5</td>
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<tr>
<td>b. Differentiate between surface distresses for different pavement types</td>
<td>ABET SO 1</td>
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<td>5</td>
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<td>c. Compute traffic for the purpose of designing pavements</td>
<td>ABET SO 1, 2</td>
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<td>d. Assess the impact of environmental factors on the sustainability of pavement performance</td>
<td>ABET SO 1</td>
<td>PS</td>
<td>5</td>
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<td>e. Analyze the input parameters for the design of pavements</td>
<td>ABET SO 1, 2</td>
<td></td>
<td>5</td>
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<td>f. Compute the life cycle costs for the various design alternatives</td>
<td>ABET SO 1, 2</td>
<td></td>
<td>5</td>
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<td>g. Explain the impact of public policy and applicable federal, state, and local ordinances on your final design</td>
<td>ABET SO 1, 6</td>
<td></td>
<td>5</td>
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<td>h. Explain the importance and implications of professional licensure and continuing education in the practice of pavement engineering</td>
<td>ABET SO 1, 6</td>
<td></td>
<td>4</td>
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<td>i. Function successfully as part of a 3-4 project design member team</td>
<td>ABET SO 5</td>
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### KEY

<table>
<thead>
<tr>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
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<tbody>
<tr>
<td>ISLO #</td>
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<tr>
<td>1 Communication Skills</td>
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<tr>
<td>Oral [O], Written [W]</td>
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<tr>
<td>2 Critical Thinking</td>
</tr>
<tr>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA] , Problem Solving [PS]</td>
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<tr>
<td>3 Foundational Skills</td>
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<tr>
<td>Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<tr>
<td>4 Social Responsibility</td>
</tr>
<tr>
<td>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
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<tr>
<td>5 Industry, Professional, Discipline Specific Knowledge and Skills</td>
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## J. APPLIED LEARNING COMPONENT: Yes__X___ No________

If Yes, select one or more of the following categories:

- Classroom/Lab_X__
- Civic Engagement__
- Internship___
- Creative Works/Senior Project___
- Clinical Practicum___
- Research___
- Practicum___
- Entrepreneurship___
- Service Learning___
- (program, class, project)
- Community Service___


M. EQUIPMENT: None

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS: Homework, Design Project, Quizzes, Exams

P. DETAILED COURSE OUTLINE:

1. Introduction
2. Traffic loading
3. Flexible pavement distresses
4. Relating pavement design to pavement response and performance
5. Subgrade and base materials
6. Asphalt materials
7. AASHTO’93 flexible pavement design procedure
8. Asphalt Institute flexible pavement design method
9. Overview of Pavement-ME design procedure for flexible pavements (NCHRP1-37A)
10. Rigid pavement distress
11. Rigid pavement response to load and relationship to design
12. Rigid pavement design approaches
13. AASHTO’93 rigid pavement design procedure
14. PCA rigid pavement design procedure
15. Overview of Pavement-ME design procedure for rigid pavements (NCHRP1-37A)
16. Joint design considerations

Q. LABORATORY OUTLINE: None