

Spring 2005

<b>Course Number</b>	CEE 410/510
<b>Title</b>	Bridge Engineering
<b>Section</b>	008
<b>CRN(s)</b>	65382/68353
<b>Credits</b>	4
<b>Prerequisite(s)</b>	Concrete & steel design (CE333 & CE434 or equiv.) Indeterminate structures (CE325 or equiv.)
<b>Days/Time</b>	Monday & Wednesday 14:00–16:40
<b>Location</b>	CH 183 (subject to change)
<b>Final Exam Day/Time</b>	Monday June 6, 1015-1205

<b>Course Website</b>	NA
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<b>Instructor</b>	Peter Dusicka, Ph.D., P.E.
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<b>Mailbox Location</b>	CEE Office, Science Building 2, Rm. 128

**Required Text or Other Materials:**

N.A.

**Recommended References/Optional Text/Supplemental Readings & Resources:**

AASHTO LRFD Bridge Design Specifications, American Association of State Highway and Transportation Officials, Washington, D.C. (if interested in purchasing from AASHTO, instructor can provide at educational price of \$270)

**Catalog Course Description:**

Introduction to analysis and design of short to medium span steel and reinforced concrete highway bridges with moving loads and design specifications using AASHTO LRFD.

**Course Objectives:**

1. gain familiarity with bridge structures
2. utilize modern (computer) tools for analysis of bridges
3. apply current specifications for bridge superstructure design

**Assessment:**

Final exam 30%, Midterm 20%, Project(s) 30%, Homework (6 to 8 problems) 20%

**Supplemental Course Activities:**

Best efforts will be made to complement the course content with guest speakers on relevant topics and go on a field trip to a bridge construction site within the Portland Area.

## **Course Outline:**

### Introduction:

- bridge types and classification
- components of highway bridges and type selection

### Bridge loading:

- AASHTO LRFD load combinations
- dead (DC & DW), live (traffic) loads

### Bridge structural analysis:

- mathematical modeling and introduction to SAP2000 analysis software
- influence lines
- superstructure distribution factors for flexure and shear

### Superstructure Design – steel plate girder bridges:

- characteristics of plate steels (& trends toward HPS)
- limit states for flexure and shear strength of composite and non-composite
- fatigue considerations
- shear connectors and cross frames
- modern detailing for economic fabrication

### Superstructure Design – CIP box girder bridges

- proportion of box girders, web & soffit flares
- limit states, development and splices

### Misc. Relevant Topics & Trends in Bridge Engineering

- FRP and steel free decks
- construction for minimizing traffic disruption

## **Computer and E-mail Accounts**

All engineering students should activate their engineering computer account (go to the CadLab in SB2, 169) which will allow them to use engineering computer labs and e-mail. You should activate it *before* the day you need it. If you encounter problems with this account, see the lab attendant, or e-mail: [support@cecs.pdx.edu](mailto:support@cecs.pdx.edu).

## **Introduction to Library and Literature Research**

With the advent of the Internet it is very tempting to think that all necessary resources for a term project will be available in full text after with internet search engines. This is not the case. You will often need to go to the library, use real library search tools and access real books and articles contained in refereed/archival journals.

Be sure to make use of the Vikat library catalog. Go to the PSU library home page at <http://www.lib.pdx.edu/>. Also available on the library home page are Full Text Electronic Journals: <http://www.lib.pdx.edu/~bvws/bytitle.html>, and a list of on-line Databases: <http://www.lib.pdx.edu/resources/databases/databases.html>. Try EI Compendex (<http://www.ei.org/ev2/ev2.home>) and Lexis-Nexis. Note that access to these databases is free for PSU students, but you must be using a computer on campus or via a dial-in service. See <http://www.lib.pdx.edu/services/distance/proxyserver.html> for instructions on how to gain off-campus access using a proxy server.

## **Campus Safety**

The University considers student safety paramount. The Campus Public Safety Office is open 24 hours a day to assist with personal safety, crime prevention and security escort services. Call 503-725-4407 for more information. For Campus emergencies call 503-725-4404.