

CIV407: BRIDGE DESIGN

WINTER 2009

Instructor: Professor C.J. Riley (you may call me C.J.)

Office: Owens 113

Office Hours: Mondays and Wednesdays from 1pm to 3pm and Tuesdays from 10am to 11am, or when my door is open, or by appointment

Phone: 885-1922

Email: charles.riley@oit.edu

Website: Blackboard CE will be used – let me know if you do not have access

Class Meetings: Wednesdays 3 – 6 pm in Cornett 115C – Transportation Lab

Prerequisites: CIV328 - Structural Analysis and Co/Prerequisites: CIV344 – Structural Steel Design or CIV331 – Reinforced Concrete Design

Texts:

Required: Design of Highway Bridges, An LRFD Approach, 2nd Ed., Richard M. Barker and Jay A. Puckett, Wiley 2007, ISBN: 0-471-69758

Provided: AASHTO LRFD Bridge Design Specifications, Customary U.S. Units, 4th Edition, 2007 with 2008 Revisions

Course Description:

Highway bridges are an integral part of our transportation network and are the costliest part of that network on a per-mile basis. The design and analysis of highway bridges requires knowledge of traditional structural analysis techniques, behavior of structural steel and reinforced, prestressed, or post-tensioned concrete, and practical aspects of bridge operation and maintenance. This course will provide an introduction to the design and analysis of short and medium-span bridge superstructures with specific examples of reinforced concrete slab bridges, steel deck girder bridges, and prestressed concrete girder bridges.

Topics:

- Historical bridge design
- Structural design process
- Aesthetics of highway bridges
- Bridge types and selection
- ASD and LRFD design methodologies
- Loads
- Limit states
- Influence functions and girder-line analysis
- Bridge plan production
- Bridge design and analysis software (BRASS)
- Design examples:
 - Reinforced concrete slab bridge design
 - Steel girder design
 - Prestressed girder design concepts

Objectives:

- Understand bridge performance requirements
- Develop a working knowledge of bridge types and design requirements
- Understand the general purpose and logic of the AASHTO Bridge Design Specifications
- Perform the design calculations for the superstructure of a bridge type of your choice

Grading: This may vary depending on the success of the class in general, but you can calculate your grade by compiling simple weighted averages of your work:

- A: 90-100%
- B: 80-90%
- C: 70-80%
- D: 60-70%
- F: <60%

Actual grades will be made available upon request as the course progresses. The weighting of assigned work is as follows:

- Homework: 25%
- Midterm Exam: 20%
- Final Exam: 20%
- Final Project: 30%
- Participation in class discussion: 5%

Comments:

- There will be significant group work. Each class period will begin with a lecture that may or may not run the entire 3 hours. Any remaining time will be used for group discussion and supervised problem solution time.
- Your solution to homework problems and design calculations for the final project should be orderly, neat, and ultimately reviewable. A critical element in bridge design is the checking of design calculations. Your work must stand up to scrutiny in the event of a failure or litigation for any other reason!

Annoying details:

- Use of cell phones in class is not tolerated. When you are in the classroom you should not have your phone on. If it rings, I get to answer it. You should not engage in any texting or anything else involving a phone, ipod, or any other communication device. You should be engaged and focused on the content of the class. Your actions have a direct impact on the respect you show your classmates and instructor.
- Academic honesty – the university policy on this (effectively a two-strike policy) is very serious. Don't make the mistake of violating it.