

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A GRADUATE COURSE
(50000-60000 LEVEL)

FFD 69-10

DEPARTMENT: Civil Engineering EFFECTIVE SESSION: Fall 2011 2012 (201310)

INSTRUCTIONS: Please check the items below which describe the purpose of this request:

<input checked="" type="checkbox"/> 1. New course with supporting documents (complete proposal form)	<input type="checkbox"/> 7. Change in course attributes
<input type="checkbox"/> 2. Add existing course offered at another campus	<input type="checkbox"/> 8. Change in instructional hours
<input type="checkbox"/> 3. Expiration of a course	<input type="checkbox"/> 9. Change in course description
<input type="checkbox"/> 4. Change in course number	<input type="checkbox"/> 10. Change in course requisites/restrictions
<input type="checkbox"/> 5. Change in course title	<input type="checkbox"/> 11. Change in semesters offered
<input type="checkbox"/> 6. Change in course credit/type	<input type="checkbox"/> 12. Transfer from one department to another

PROPOSED: Subject Abbreviation CE Course Number 67401 Long Title _____ Short Title Bridge Engineering

EXISTING: Subject Abbreviation _____ Course Number _____

TERMS OFFERED: Check All That Apply: Fall Spring Summer

CAMPUS(ES) INVOLVED: Calumet N. Central Cont Ed Tech Statewide Ft. Wayne W. Lafayette Indianapolis

CREDIT TYPE: 3

1. Fixed Credit: Cr. Hrs. 3

2. Variable Credit Range: Minimum Cr. Hrs. _____ To _____ Or _____ Maximum Cr. Hrs. _____

3. Equivalent Credit: Yes No 3

4. Thesis Credit: Yes No 3

COURSE ATTRIBUTES: Check All That Apply

1. Pass/Not Pass Only 2. Satisfactory/Unsatisfactory Only 3. Repeatable 4. Credit by Examination 5. Registration Approval Type 6. Registration Approval Type Department Instructor 7. Variable Title 8. Honors 9. Full Time Privilege 10. Off Campus Experience

Schedule Type	Min	Max	% of Credit Allocated
Lecture	50	3	15
Recitation			
Presentation			
Laboratory			
Lab Prep			
Studio			
Distances			
Clinic			
Experiential			
Research			
Ind. Study			
Pract/Observ			

OFFICE OF THE REGISTRAR
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COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
 Sem 1 or 2. Class 3, Cr. 3.
 Concurrent prerequisites: CE 57200 and CE 59100.
 This course reviews a number of fundamental topics related to the structural design of highway bridges. Some of the key features include bridge types, aesthetics, structural analysis methods, vehicle load distribution, deck design and detailing, steel girder design, concrete girder design, integral abutment design, bearings, and construction.
 Professor Bowman.

Calumet Department Head _____ Date _____	Calumet School Dean _____ Date _____	Calumet Undergrad Curriculum Committee _____ Date _____
Fort Wayne Department Head _____ Date _____	Fort Wayne School Dean _____ Date _____	Fort Wayne Chancellor _____ Date _____
Indianapolis Department Head _____ Date _____	Indianapolis School Dean _____ Date _____	<u>R. Cepra</u> 3/23/2011 Undergrad Curriculum Committee _____ Date _____
North Central Department Head _____ Date _____	North Central School Dean _____ Date _____	APPROVED 2/16/12 Date Approved by Graduate Council _____
<u>M.K. Bondax</u> _____ Date _____	<u>Le Carl Hill</u> 3/31/11 West Lafayette College/School Dean _____ Date _____	<u>Trina L. Payne</u> 2/23/12 Graduate Council Secretary _____ Date _____
<u>Young E. Kim</u> 2/16/12 Graduate Area Committee Convener _____ Date _____	Graduate Dean _____ Date _____	<u>Donald Schaefer</u> 3/13/12 West Lafayette Registrar _____ Date _____

dt 12

Supporting Document for a New Graduate Course

To: Purdue University Graduate Council
From: Faculty Member: Mark Bowman
Department: Civil Engineering
Campus: West Lafayette
Date: February 4, 2011
Subject: Proposal for New Graduate Course-Documentation Required by the Graduate Council to Accompany Registrar's Form 40G

For Reviewer's comments only (Select One)
Reviewer:
Comments:

Contact for information if questions arise: Name: Jon Fricker
Phone Number: 494-2205
E-mail: fricker@purdue.edu
Campus Address: CIVL G 167C

Course Subject Abbreviation and Number: CE 67400

Course Title: Bridge Engineering

A. Justification for the Course:

- Provide a complete and detailed explanation of the need for the course...
Justify the level of the proposed graduate course (50000- or 60000-level) including statements on, but not limited to: (1) the target audience...

B. Learning Outcomes and Method of Evaluation or Assessment:

- Describe the course objectives and student learning outcomes that address the objectives (i.e., knowledge, communication, critical thinking, ethical research, etc.).
Describe the methods of evaluation or assessment of student learning outcomes. (Include evidence for both direct and indirect methods.)
Grading criteria (select from dropdown box); include a statement describing the criteria that will be used to assess students and how the final grade will be determined.

Criteria Exams and Quizzes

- Identify the method(s) of instruction (select from dropdown box) and describe how the methods promote the likely success of the desired student learning outcomes.

Method of Instruction | Lecture

C. Prerequisite(s):

- List prerequisite courses by subject abbreviation, number, and title.
- List other prerequisites and/or experiences/background required. If no prerequisites are indicated, provide an explanation for their absence.

D. Course Instructor(s):

- Provide the name, rank, and department/program affiliation of the instructor(s).
- Is the instructor currently a member of the Graduate Faculty? Yes No
(If the answer is no, indicate when it is expected that a request will be submitted.)

E. Course Outline:

- Provide an outline of topics to be covered and indicate the relative amount of time or emphasis devoted to each topic. If laboratory or field experiences are used to supplement a lecture course, explain the value of the experience(s) to enhance the quality of the course and student learning. For special topics courses, include a sample outline of a course that would be offered under the proposed course.

F. Reading List (including course text):

- A primary reading list or bibliography should be limited to material the students will be required to read in order to successfully complete the course. It should not be a compilation of general reference material.
- A secondary reading list or bibliography should include material students may use as background information.

G. Library Resources

- Describe the library resources that are currently available or the resources needed to support this proposed course.

H. Example of a Course Syllabus (While not a necessary component of this supporting document, an example of a course syllabus is available, for information, by clicking on the link below, which goes to the *Graduate School's Policies and Procedures Manual for Administering Graduate Student Programs*. See Appendix K.)

http://www.gradschool.purdue.edu/downloads/Graduate_School_Policies_and_Procedures_Manual.pdf

CE 67400 Bridge Engineering

A. Justification for the Course:

CE 67400 (Bridge Engineering) provides basic background in bridge design and behavior that exposes students to bridge design and construction specifications that are not covered elsewhere in the curriculum. The class is 60000 level since material required in two other 50000 level classes are required as prerequisite or co requisite.

Term	Enrollment
Fall 2003	16
Spring 2005	14
Spring 2007	10
Fall 2008	21
Fall 2010	39

B. Learning Outcomes and Method of Evaluation or Assessment:

The objective of this course is to solidify students' understanding of the material taught in CE 67400 (Bridge Engineering) and introduce them to fundamental aspects involved in the design and construction of bridges. At the conclusion of the class, students should be able to understand critical aspects of the AASHTO (American Association of State Highway and Transportation Officials) bridge design requirements for steel and concrete superstructures and bridge decks.

Grading Scale:

One exam will be held during the semester. A comprehensive final examination will be given at the prescribed time and date during the final exam week. The breakdown of points for the course is noted below:

Howeworks	15 %
Exam One	20 %
Mini Project(s)	20 %
Design Project	45 %
<hr style="width: 10%; margin: 0 auto;"/>	
Total	100 %

Required Projects, Assignments and Grading:

A number of individual homework exercises will be assigned pertaining to the material covered.

A short paper will be assigned that will ask each student to examine the design and aesthetic features of a specific bridge. Additional mini projects may also be assigned.

The class will be divided into small teams that will be responsible for the design of a concrete and steel structure at a particular site in the midwest. A design report and class

presentation of the team-generated design will be required. Teams are expected to work independently to develop a unique and original design for the selected site.

C. Prerequisite(s):

CE 57200 and CE 59100.

D. Course Instructor(s):

Mark Bowman and others.

E. Course Outline:

Class No.	Date	Class Activity
1	Aug 23	Introduction/ Course Overview
2	Aug 25	General Information, Specifications
3	Aug 27	Bridge Terminology, Aesthetics
	Aug 30	Bridge Aesthetics
4	Spt 1	Analysis
5	Spt 3	Project Management and Development (McCool)
6	Spt 6	No Class – Labor Day
7	Spt 8	Analysis
8	Spt 10	Bridge Plan and Design Process (McCool)
9	Spt 13	Analysis
10	Spt 15	Overview of (Project) Bridge Structure (McCool)
11	Spt 17	Analysis
12	Spt 20	Analysis
13	Spt 22	Analysis
14	Spt 24	Analysis
15	Spt 27	Analysis
16	Spt 29	Analysis/Project Expectations
17	Oct 1	Single Point Interchange (McCool)
18	Oct 4	Deck Design
19	Oct 6	Deck Design
20	Oct 8	Steel Superstructure Design
	Oct 11	No Class - Fall Break (Oct 11-12)
21	Oct 13	Steel Superstructure Design
22	Oct 15	Steel Superstructure Design

Class No.	Date	Class Activity
23	Oct 18	Steel Superstructure Design
24	Oct 20	Steel Superstructure Design
25	Oct 22	Steel Superstructure Design
26	Oct 25	Steel Superstructure Design
27	Oct 27	Steel Superstructure Design
28	Oct 29	Construction Loadings & Code checks (McCool)
29	Nov 1	Steel Superstructure Design
30	Nov 3	Concrete Superstructure Design
31	Nov 5	Concrete Superstructure Design
32	Nov 8	Concrete Superstructure Design
33	Nov 10	Concrete Superstructure Design
34	Nov 12	Concrete Superstructure Design
35	Nov 15	Concrete Superstructure Design
36	Nov 17	Concrete Superstructure Design
37	Nov 19	Concrete Superstructure Design
38	Nov 22	Concrete Superstructure Design
	Nov 24	No Class – Thanksgiving Break
	Nov 26	No Class – Thanksgiving Break
39	Nov 29	Integral Abutments
40	Dec 1	Railroad Bridge Design
41	Dec 3	Substructure Design
42	Dec 6	Bearings
43	Dec 8	Project
44	Dec 10	Project
	December 13- 18	Group Presentations

F. Reading List (including course text):

Text: Tonias, Demetrios E. and Zhao, Jim J., “Bridge Engineering: Design, Rehabilitation, and Maintenance of Modern Highway Bridges,” McGraw-Hill Company, Second Edition, 2007.

Reference Materials:

“LRFD Bridge Design Specifications,” AASHTO, 4th Edition, U.S. Units, 2007. Interim updates in 2008, 2009.

“Bridge Design Manual,” PCI, 1997

Barker, Richard M. and Puckett, Jay A., “Design of Highway Bridges: An LRFD Approach,” John Wiley & Sons, Inc., 2nd Edition, 2007.

Selected reports and publications will be made available and/or places on reserve in CIVL 4141.

G. Library Resources: No Library Resources are needed at this time.

H. Example of Course Syllabus: See Attached

**CE 697S
BRIDGE ENGINEERING**

Fall 2010

Lecture: MWF 8:30 am CIVL 2123

Professor Mark D. Bowman
Office: CIVL 4143, Ph. 494-2220, e-mail: bowmanmd@ecn.purdue.edu

Textbook:

Tonias, Demetrios E. and Zhao, Jim J., "Bridge Engineering: Design, Rehabilitation, and Maintenance of Modern Highway Bridges," McGraw-Hill Company, Second Edition, 2007.

Reference Materials:

"LRFD Bridge Design Specifications," AASHTO, 4th Edition, U.S. Units, 2007. Interim updates in 2008, 2009.

"Bridge Design Manual," PCI, 1997.

Barker, Richard M. and Puckett, Jay A., "Design of Highway Bridges: An LRFD Approach," John Wiley & Sons, Inc., 2nd Edition, 2007.

Selected reports and publications will be made available and/or placed on reserve in CIVL 4141.

Grading Scale:

One exam will be held during the semester. A comprehensive final examination will be given at the prescribed time and date during the final exam week. The breakdown of points for the course is noted below:

Howeworks	15 %
Exam One	20 %
Mini Project(s)	20 %
Design Project	45 %
	<hr/>
Total	100 %

Required Projects, Assignments and Grading:

A number of individual homework exercises will be assigned pertaining to the material covered.

A short paper will be assigned that will ask each student to examine the design and aesthetic features of a specific bridge. Additional mini projects may also be assigned.

The class will be divided into small teams that will be responsible for the design of a concrete and steel structure at a particular site in the midwest. A design report and class presentation of the team-generated design will be required. Teams are expected to work independently to develop a unique and original design for the selected site.

Class Attendance and Other Matters:

Attendance is expected for all meetings of the class throughout the semester – see Part 1, Section VI, Subsection A of the University Regulations. If you know in advance that you will not be able to attend a particular meeting of the class, then it is your responsibility to inform Professor Bowman accordingly.

Academic honesty is paramount. See the student Code of Honor in Part 5, Section II of the University Regulations.

Engineering paper should be used for all handwritten homework solutions. Moreover, the following practice is expected for all work that you submit: use one side of the paper only, straight edge used for all drawings produced by hand, be neat and orderly, use proper significant places for all final answers, and highlight or underline all final answers. The use of Mathcad or equivalent is also acceptable, as long as the logic pattern is clearly shown and understandable.

Emergency Escape Plan:

Fire: Exit the Civil Engineering Building using the western stairwell exit. All students should gather outside the CE Building in the mall area between CE and Nursing and wait for further instructions.

Tornado: Use the western stairwell exit and proceed to the basement. Remain in the basement until the all clear is sounded.

Civil Disturbance: Remain in room until the situation can be assessed. Stay clear of doors and windows.

For additional information review the emergency procedures described on the Purdue Fire Department website.

Engineering Faculty Document No. 69-10
February 4, 2011

TO: The Faculty of the College of Engineering
FROM: The Faculty of the School of Civil Engineering
SUBJECT: New course CE 67400 Bridge Engineering

The faculty of the School of Civil Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with recommendation for approval.

CE 67400 Bridge Engineering

Sem 1 or 2. Class 3, Cr. 3.

Concurrent prerequisites: CE 57200 and CE 59100.

Course Description: This course reviews a number of fundamental topics related to the structural design of highway bridges. Some of the key features include bridge types, aesthetics, structural analysis methods, vehicle load distribution, deck design and detailing, steel girder design, concrete girder design, integral abutment design, bearings, and construction considerations.

Reasons: Most of the design classes in the structural engineering curriculum are geared towards building design and construction. Accordingly, the students are exposed to building code requirements in both ACI 318 and AISC 360 for concrete and steel structures, respectively. However, bridge structures are loaded differently and behave differently than building structures. The design of bridge structures is governed by the American Association of State Highway and Transportation Officials Load and Resistance Factor Design (AASHTO LRFD) specification requirements. The new bridge course will examine the behavior of several different critical bridge elements subject to vehicle loading and it will review the basic requirements for the design of steel and concrete structures according to the AASHTO code.

This course was offered on an experimental basis five times between Fall 2003 and Fall 2010, with enrollments of 16, 14, 10, 21, and 39 students.

M.K. Banks

M.K. Banks

Bowen Engineering Head and Professor

Jack and Kay Hockema Professor of Civil Engineering

APPROVED FOR THE FACULTY
OF THE SCHOOLS OF ENGINEERING
BY THE ENGINEERING
CURRICULUM COMMITTEE

ECC Minutes #14

Date March 23, 2011

Chairman ECC R. Cipra

CE 67400 Bridge Engineering

- **Course Instructor:** Mark Bowman

- **Course Description:**

This course reviews a number of fundamental topics related to the structural design of highway bridges. Some of the key features include bridge types, aesthetics, structural analysis methods, vehicle load distribution, deck design and detailing, steel girder design, concrete girder design, integral abutment design, bearings, and construction considerations.

- **Course Outline:**

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1	Introduction/ Course Overview
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3	Bridge Terminology, Aesthetics
	Bridge Aesthetics
4	Analysis
5	Project Management and Development (McCool)
6	No Class -- Labor Day
7	Analysis
8	Bridge Plan and Design Process (McCool)
9	Analysis
10	Overview of (Project) Bridge Structure (McCool)
11	Analysis
12	Analysis
13	Analysis
14	Analysis
15	Analysis
16	Analysis/Project Expectations
17	Single Point Interchange (McCool)
18	Deck Design
19	Deck Design
20	Steel Superstructure Design
	No Class - Fall Break (Oct 11-12)
21	Steel Superstructure Design
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Class No.	Class Activity
23	Steel Superstructure Design
24	Steel Superstructure Design
25	Steel Superstructure Design
26	Steel Superstructure Design
27	Steel Superstructure Design
28	Construction Loadings & Code checks (McCool)
29	Steel Superstructure Design
30	Concrete Superstructure Design
31	Concrete Superstructure Design
32	Concrete Superstructure Design
33	Concrete Superstructure Design
34	Concrete Superstructure Design
35	Concrete Superstructure Design
36	Concrete Superstructure Design
37	Concrete Superstructure Design
38	Concrete Superstructure Design No Class – Thanksgiving Break No Class – Thanksgiving Break
39	Integral Abutments
40	Railroad Bridge Design
41	Substructure Design
42	Bearings
43	Project
44	Project

Total = 15 weeks

- **Text:** Tonias, Demetrios E. and Zhao, Jim J., "Bridge Engineering: Design, Rehabilitation, and Maintenance of Modern Highway Bridges," McGraw-Hill Company, Second Edition, 2007.

Reference Materials:

"LRFD Bridge Design Specifications," AASHTO, 4th Edition, U.S. Units, 2007. Interim updates in 2008, 2009.

"Bridge Design Manual," PCI, 1997.

Barker, Richard M. and Puckett, Jay A., "Design of Highway Bridges: An LRFD Approach," John Wiley & Sons, Inc., 2nd Edition, 2007.

Selected reports and publications will be made available and/or placed on reserve in CIVL 4141.

- **Grading Scale:** One exam will be held during the semester. A comprehensive final examination will be given at the prescribed time and date during the final exam week. The breakdown of points for the course is noted below:

Home works	15 %
Exam One	20 %
Mini Project(s)	20 %
Design Project	45 %
	<hr/>
Total	100 %

CE 67401

Duncan, Lauren N

From: Duncan, Lauren N
Sent: Friday, March 09, 2012 4:13 PM
To: 'gjeong@ecn.purdue.edu'
Subject: RE: CE 67400

Garrett,

Per your response below, I will proceed with 67401. Thank you for your assistance.

Best Regards,
Lauren
Lauren Duncan
Catalog Coordinator
Office Of The Registrar
Hovde Hall, Rom 48
West Lafayette, IN 47906
765.494.6308 | 765.494.0570
www.purdue.edu/registrar
How are we doing

-----Original Message-----

From: gdj@fourier.ecn.purdue.edu [mailto:gdj@fourier.ecn.purdue.edu] On Behalf Of gjeong@ecn.purdue.edu
Sent: Friday, March 09, 2012 1:53 PM
To: Duncan, Lauren N
Cc: Crawford, Melba M; 'gjeong@purdue.edu'; Sondgerath, William J; Fellure, Debra S.; Lah, Marta Tamara
Subject: Re: CE 67400

Lauren,

CE 67401 will work.

Thanks,
Garrett Jeong

> I am forwarding this to Garrett Jeong for his input.

>

> Melba Crawford

>

>

>> From: Duncan, Lauren N

>> Sent: Thursday, March 08, 2012 12:41 PM

>> To: Crawford, Melba M

>> Cc: Sondgerath, William J; Fellure, Debra S.

Subject: FW: CE 67400 & BME 62600

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>> Good Afternoon. I'm reviewing CE 67400 and this course

