

Engineering Faculty Document 41-13
January 16, 2013

TO: The Faculty of the College of Engineering
FROM: School of Engineering Education
RE: New Graduate Course, ENE 51100

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

ENE 51100: Effective Teaching in Engineering: Linking Theory and Practice

Sem. 1; 2; SS Class 1, Cr. 1

Prerequisites: None

Restrictions: (1) Graduate standing, and (2) currently engaged in a significant and mentored teaching experience, and (3) consent of course instructor.

Attributes: Repeatable (max 3 Cr.)

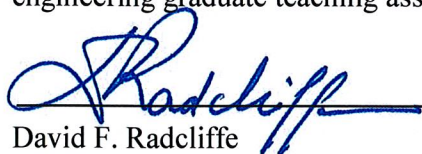
Description:

This course is designed to provide engineering graduate teaching assistants (GTAs) with a structured, integrated opportunity to make connections between education theory and teaching practice. This is accomplished by using a disciplined framework for gathering and interpreting evidence for demonstrating the competencies that were agreed to in a learning contract developed with a teaching mentor prior to taking up the teaching assignment.

Reason:

The purpose for this course is to enable graduate students who are currently engaged in a significant and mentored teaching experience to articulate the development of their teaching competencies and to develop a coherent teaching philosophy informed by theory. A teaching experience will be considered significant if the GTA has responsibilities that encompass preparing for and teaching students in a formal setting (e.g., lecture, laboratory) for at least 4 hours during the course of the semester. The teaching experience will be considered mentored if the GTA has a graduate faculty mentor who will attend 2 instances of the GTA teaching, provide feedback, and have monthly meetings with the GTA to discuss teaching topics and issues. The GTAs teaching responsibilities and mentorship must be formalized in a contract and shared with the ENE 51100 instructor. This course will also enable GTAs to develop knowledge about effective teaching practices and establish an engineering "community of teachers" of engineering faculty and peers.

This course has been offered three times on a limited access, experimental basis as an ENE 59500 course. Enrollments were 3 (Fall 2007), 11 (Fall 2008), and 6 (Fall 2009). It is anticipated that demand will be significantly greater once the course is offered on a permanent basis to any engineering graduate teaching assistant.



David F. Radcliffe

Kamyar Haghighi Head, School of Engineering Education
Epistemology Professor of Engineering Education

PURDUE UNIVERSITY

Print Form

EFD: 41-13

Office of the Registrar
FORM 40G REV. 10/10

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

DEPARTMENT Engineering Education

EFFECTIVE SESSION Fall 2013

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 |
| <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:

EXISTING:

TERMS OFFERED

Check All That Apply:

Subject Abbreviation ENE

Subject Abbreviation _____

Fall Spring Summer

Course Number 51100

Course Number _____

CAMPUS(ES) INVOLVED

Long Title Effective Teaching in Engineering: Linking Theory and Practice

Short Title Effective Teaching in ENGR.

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> Calumet | <input type="checkbox"/> N. Central |
| <input type="checkbox"/> Cont Ed | <input type="checkbox"/> Tech Statewide |
| <input type="checkbox"/> Ft. Wayne | <input checked="" type="checkbox"/> W. Lafayette |
| <input type="checkbox"/> Indianapolis | |

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

CREDIT TYPE

1. Fixed Credit: Cr. Hrs. 1
2. Variable Credit Range:
Minimum Cr. Hrs. _____
(Check One) To Or
Maximum Cr. Hrs. _____
3. Equivalent Credit: Yes No
4. Thesis Credit: Yes No

COURSE ATTRIBUTES: Check All That Apply

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

Schedule Type	Minutes Per Mto	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	50	1	16	100
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

Prerequisites: None

Restrictions: (1) Graduate standing, and (2) currently engaged in a significant and mentored teaching experience, and (3) consent of course instructor.

This course is designed to provide engineering graduate teaching assistants (GTAs) with a structured, integrated opportunity to make connections between education theory and teaching practice. This is accomplished by using a disciplined framework for gathering and interpreting evidence for demonstrating the competencies that were agreed to in a learning contract developed with a teaching mentor prior to taking up the teaching assignment.

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 _____	Undergrad Curriculum Committee _____ Date _____
North Central Department Head _____ Date _____	North Central School Dean _____ Date _____	Date Approved by Graduate Council _____
West Lafayette Department Head _____ Date _____	West Lafayette College/School Dean _____ Date _____	Graduate Council Secretary _____ Date _____
Graduate Area Committee Convener _____ Date _____	Graduate Dean _____ Date _____	West Lafayette Registrar _____ Date _____

OFFICE OF THE REGISTRAR

ENE 51100: Effective Teaching in Engineering: Linking Theory and Practice

A. Justification of Course

The purpose for this course is to enable graduate students who are currently engaged in a significant and mentored teaching experience to articulate the development of their teaching competencies and to develop a coherent teaching philosophy informed by theory. This course will also enable GTAs to develop knowledge about effective teaching practices and establish an engineering “community of teachers” of engineering faculty and peers.

This course has been offered three times on a limited access, experimental basis as an ENE 59500 course. Enrollments were 3 (Fall 2007), 11 (Fall 2008), and 6 (Fall 2009). It is anticipated that demand will be significantly larger once the course is offered on a permanent basis.

B. Learning Outcomes and Method of Assessment

Upon successful completion of this course, students will be able to

- Document pedagogical expertise by applying relevant theory and evidenced-based teaching methods and strategies to the design of a learning activity and the development of a personal teaching philosophy.
- Establish a support network or community with other engineering TAs and engineering faculty through engagement in open dialogues about teaching and curricular design for undergraduate or graduate engineering courses.
- Critically analyze the impacts of their teaching practice on undergraduate or graduate student learning.

These learning outcomes will be assessed as follows:

Attendance and Participation	10%
Journal Entries	15%
Teaching Philosophy	5% (Pre) / 10% (Post)
Faculty Interview	15%
Teaching Competencies	5% (Contract) / 25% (Gains)
Design a Learning Activity	15%

Method of Instruction - Seminar

C. Prerequisite(s)

- No prerequisites Co-requisite: The student must be currently engaged in a significant and mentored teaching experience. A teaching experience will be considered significant if the GTA has responsibilities that encompass preparing for and teaching students in a formal setting (e.g., lecture, laboratory) for at least 4 hours during the course of the semester. The teaching experience will be considered mentored if the GTA is formally assigned a mentor who will attend 2 instances of the GTA teaching, provide feedback, and have monthly meetings with the GTA to discuss teaching topics and

issues. The GTAs teaching responsibilities and mentorship must be formalized in a contract and shared with the ENE 511 instructor.

- A student can enroll in this course on three separate occasions during the time they are in their graduate program. However, for each subsequent enrollment, the sophistication of the work in the learning contract and level of professional challenge must be distinct from or at a higher level than in the previous time they were enrolled in this course.

D. Course Instructors

Name	Rank	School	Graduate faculty
Heidi Diefes-Dux	Associate Professor	Engineering Education	Yes
David F Radcliffe	Professor	Engineering Education	Yes
Monica Cox	Associate Professor	Engineering Education	Yes

E. Course Outline

Wk	Topic	Assignments Due
1	Course Overview, Syllabus, Reflective Writing	None
2	Engineering students and engineering classrooms	<ul style="list-style-type: none"> ▪ Reading: Learning to Think chapter ▪ Reading: Millennial students ▪ Journal Entry #1
3	Backward design; teaching in engineering classrooms	<ul style="list-style-type: none"> ▪ Reading: Backward design ▪ Teaching Competencies Contract ▪ Journal Entry #2
4	Teaching philosophies	<ul style="list-style-type: none"> ▪ Teaching philosophy (pre) ▪ Journal Entry #3
5	Taxonomies (Perry, Bloom, and Kolb)	<ul style="list-style-type: none"> ▪ Reading: Taxonomies ▪ Journal Entry #4
6	How People Learn framework	<ul style="list-style-type: none"> ▪ Reading: HPL reading 1 ▪ Journal Entry #5
7	Feedback; PCK	<ul style="list-style-type: none"> ▪ Reading: PCK ▪ Journal Entry #6
8	BREAK – NO CLASS	
9	HPL; in-class lab	<ul style="list-style-type: none"> ▪ Reading: HPL Reading 2
10	Peer observations; student feedback	<ul style="list-style-type: none"> ▪ Journal Entry #7 ▪ Student feedback
11	Cooperative learning	<ul style="list-style-type: none"> ▪ Reading: Cooperative learning ▪ Journal Entry #8
12	In-class lab	<ul style="list-style-type: none"> ▪ Faculty interview
13	ABET Processes	<ul style="list-style-type: none"> ▪ Reading: ABET ▪ Journal Entry #9
14	Design of Learning Environments	<ul style="list-style-type: none"> ▪ Reading: Space

Wk	Topic	Assignments Due
15	Teaching philosophies	▪ Teaching philosophies (post)
16	Class wrap-up and evaluation	▪ Journal Entry #10
17	No class	▪ Teaching Competencies Gains

F. Partial Reading List

1. Bransford, J. Brown, A.L. and Cocking, R.R. (2004) *How People Learn: Brain, Mind, Experience, and School* <http://www.nap.edu/openbook.php?isbn=0309070368>
2. Assessment Primer: University of Connecticut. <http://assessment.uconn.edu/primer/index.html>
3. Anderson, L.W and Krathwohl, D.R (eds) (2000) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objective*, ISBN-10: 080131903X
4. Lynch, D. (2010). Application of online discussion and cooperative learning strategies to online and blended college courses. *College Student Journal*, 44(3), 777-784
5. Radcliffe, D.F., Wilson, H., Powell, D. Tibbetts, B (eds) (2008) *Learning Spaces in Higher Education: Positive Outcomes by Design*

G. Library Resources

The current holdings of the Purdue University Libraries provide sufficient access to readings and resources for this course.

Supporting Document for a New Graduate Course

To: Purdue University Graduate Council

From: Faculty Member: R. Adams, D. Radcliffe, M. Cox
Department: School of Engineering Education (ENE)
Campus: Purdue University, West Lafayette

Date: _____

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: Cindey Hays
Phone Number: 43884
E-mail: isenberg@purdue.edu
Campus Address: ARMS 1321

Course Subject Abbreviation and Number: ENE 51100

Course Title: Effective Teaching in Engineering: Linking Theory and Practice

A. Justification for the Course:

- Provide a complete and detailed explanation of the need for the course (e. g., in the preparation of students, in providing new knowledge/training in one or more topics, in meeting degree requirements, etc.), how the course contributes to existing majors and/or concentrations, and how the course relates to other graduate courses offered by the department, other departments, or interdisciplinary programs.
- Justify the level of the proposed graduate course (50000- or 60000-level) including statements on, but not limited to: (1) the target audience, including the anticipated number of undergraduate and graduate students who will enroll in the course; and (2) the rigor of the course.

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 | Papers and Projects

- 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

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