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

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

Print Form

EFD 53-11

DEPARTMENT School of Engineering Education

EFFECTIVE SESSION Fall 2011

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

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

PROPOSED:

Subject Abbreviation: ENE

Course Number: 50400

Long Title: Leadership, Policy, and Change in Science, Technology, Engineering, and Mathematics (STEM) Education

Short Title:

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

EXISTING:

Subject Abbreviation:

Course Number:

TERMS OFFERED
Check All That Apply:
[ ] Fall [X] Spring [ ] Summer

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

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 3
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: [ ]
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 Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	170	1	16	
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):

This course will be framed around a historical and current perspective of STEM policy across various educational domains (e.g., secondary and postsecondary), political organizations (state, national, and international governments), and across different groups of people (e.g., students, teachers, and policymakers) and will examine the relationships among education policy, leadership theories, models of systemic change and STEM constituents and organizations. The class involves a combination of lecture, experiential exercises, discussion, in-class presentations, videos, individual assignments, and team assignments. At the end of the course, students will have opportunities to complete projects and/or produce deliverables (e.g., research proposals) that explore ways that they might add to the scholarship of STEM education policy and influence leadership, policy, and organizational change as it relates to STEM education topics of their choosing.

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	4/27/12 Date	West Lafayette College/School Dean	5/29/12 Date	Graduate Council Secretary	Date
Graduate Area Committee Convener	Date	Graduate Dean	Date	West Lafayette Registrar	Date

OFFICE OF THE REGISTRAR

To: The Faculty of the College of Engineering

From: School of Engineering Education

Subject: New Graduate Course, ENE 50400

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

ENE 50400: Leadership, Policy, and Change in Science, Technology, Engineering, and Mathematics (STEM) Education

Sem. 2, Class 3, Cr. 3.

Prerequisite: There are no course prerequisites.

Course description:

This course will be framed around a historical and current perspective of STEM education policy across various educational domains (e.g., secondary and postsecondary), political organizations (state, national, and international governments), and across different groups of people (e.g., students, teachers, and policymakers) and will examine the relationships among education policy, leadership theories, models of systemic change and STEM constituents and organizations. Students will complete projects and/or produce deliverables that explore ways that they might add to the scholarship of STEM education policy and influence leadership, policy, and organizational change as it relates to STEM education topics of their choosing. This course is a fast-paced, reading intensive course that provides a broad overview of STEM leadership, policy, and change.

Reasons:

This course provides an opportunity for STEM graduate and advanced undergraduate students to engage in conversations about leadership, policy, and change within the context of STEM education and to frame these ideas within the context of real cases and practical problems. Since Purdue's College of Education no longer has a primary concentration in Higher Education Administration, this course allows STEM students to engage in leadership, policy, and change topics within the context of postsecondary education. Such a course has allowed approximately 70 students from the Colleges of Education, Technology, Engineering, and Science to engage in STEM policy and to understand how such policies relate to their current and future research interests.

This course was originally taught as ENE 695I, has been offered five terms in spring 2007, 2008, 2009, 2010, and 2011 with enrollments between 6 and 22 students. Although a majority of the enrollment has come from Engineering Education, the course also enrolls students from the Colleges of Education, Technology, Engineering, and Science. Since its first offering, approximately 70 students have enrolled in the course. Evaluation results indicate the course is well received by students, and is achieving its intended learning outcomes.

Radcliffe

David Radcliffe, Kamyar Haghighi Head
School of Engineering Education

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

ECC Minutes _____

Date 5-25-2012

Chairman ECC R. Cipra

ENE 50400: Leadership, Policy, and Change in Science, Technology, Engineering, & Mathematics (STEM) Education

Course instructor(s): Dr. Monica F. Cox

Course description:
This course will be framed around a historical and current perspective of STEM education policy across various educational domains (e.g., secondary and postsecondary), political organizations (state, national, and international governments), and across different groups of people (e.g., students, teachers, and policymakers) and will examine the relationships among education policy, leadership theories, models of systemic change and STEM constituents and organizations. The class involves a combination of lecture, experiential exercises, discussion, in-class presentations, videos, individual assignments, and team assignments. At the end of the course, students will have opportunities to complete projects and/or produce deliverables (e.g., research proposals) that explore ways that they might add to the scholarship of STEM education policy and influence leadership, policy, and organizational change as it relates to STEM education topics of their choosing. Since a diverse group of students representing the multiple Colleges enroll in the course. It is helpful for students to have engaged in prior reading- and writing- intensive courses that required them to synthesize large amounts of information.

Course learning outcomes:

As a result of taking this course, participants will develop the knowledge and skills to:

- Develop new ways to think about the leadership process
- Explore factors that contribute to effective and ineffective leadership within STEM organizations
- Explore and understand the political and policy dimensions of leadership via theoretical approaches to political and policy analysis
- Investigate the roles of STEM policy at local, state, national, and international levels
- Develop skills in analyzing policy alternatives and selecting "solutions" within the STEM education domain
- Evaluate barriers and enablers of diffusion of innovative processes
- Evaluate challenges for and models of systemic change
- Explore key aspects and applications of systemic (sustainable and deep) change of educational systems
- Explore negotiation strategies and ways to implement change within STEM environments

Course outline

TENTATIVE COURSE SCHEDULE/ TOPICS

Date	Topic	Readings Due
Jan. 21	Introductions, course syllabus, course overview, and introduction to leadership, policy, and change	

Date	Topic	Readings Due
Jan. 28	Leadership	Vecchio, R.P. (Ed). (1997). *Leadership: Understanding the dynamics of power and influence in organizations.* Notre Dame, IN: Notre Dame Press. (Parts I and II) Farr, J.V., Walesh, S.G., & Forsythe, G.B. (1997). Leadership development for engineering managers. *Journal of Management in Engineering, 13,* 4, 38-41. Congressional Research Service (CRS) (2007). *Science, Technology, Engineering, and Mathematics (STEM) Education: Background, Federal Policy, and Legislative Action.*
Feb. 4	Leadership/ STEM Education	Vecchio- Parts III and IV U.S. Department of Education. (2007). *Report of the Academic Competitive Council,* Washington, DC. Graham, R., Crawley, E., & Mendelsohn, B.R. (2009). *Engineering Leadership Education: A Snapshot Review of International Good Practice.* White Paper sponsored by the Bernard M. Gordon□MIT Engineering Leadership Program.
Feb. 11	Leadership	Vecchio- Part V (excluding Rafferty p. 434), Part VI (p. 507-562) Dunn, K. (2009). The Case of Leadership Skills Courses in Engineering Curriculum. Proceedings of the 2009 Midwest Section Conference of the American Society of Engineering Education. Zoli et al., (2008). Engineering Women and Leadership. Morgan and Claypool Publishers.
Feb. 18	Leadership	NSF Engineering and Science Indicators 2010 (You are responsible for reading the overview and the content in your chapter only). http://www.nsf.gov/statistics/seind10/ Each student will present a 5-10 minute summary about one of the chapters. This presentation should present an overview of the major points within your chapter and a connection of this content to leadership (refer to reading thus far). Provide any criticisms about the data or findings, and identify future directions for STEM education. **One-Page Proposal of Synthesis Project Due**

Date	Topic	Readings Due
Feb. 25	Policy	Ripley, R.B. The Nature of the Policy Process. (1997). In *Public Policy and Higher Education.* (Eds.) (Goodchild et. al.). ASHE Readers Series, pp. 3-16. Lindblom, C.E. & Woodhouse, E.J. (1992). The Challenges Facing Policy Making. In *The Policy-Making Process.* (3rd Ed.) Prentice Hall: NJ. pp. 2-12. McDonnell, L.M., & Elmore, R.F. (1987). Getting the Job Done: Alternative Policy Instruments. *Educational Evaluation and Policy Analysis, 9,* 2, pp. 133-152. Additional Policy Readings TBD.
Mar. 4	Policy	Gill, J.I., & Saunders, L. (1997). Conducting Policy Analysis in Higher Education. In *Public Policy and Higher Education.* (Eds.) (Goodchild et. al.). ASHE Readers Series, pp. 225-233. Hanushek, E.A. (2005), Policy Analysis: Is It, or Could it Be the Fifth Estate? Association for Public Policy Analysis and Management, 20 pages. McCarthy, M.M., & Hall, G.C. (1989). The Emergence of University-Based Education Policy Centers. ERIC/CEM Trends and Issues Series, Number 2, 23 pages. BEST: Building Engineering and Science Talent. (2004a.) *A Bridge for All: Higher Education Design Principles to Broaden Participation in Science, Technology, Engineering, and Mathematics.* San Diego, Calif.: BEST, BEST: Building Engineering and Science Talent. (2004b). *The Talent Imperative: Diversifying America's Science and Engineering Workforce.* San Diego, Calif.: BEST.
Mar. 11	Policy	National Academy of Engineering. *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future.* Washington, D.C.: National Academies Press, 2006. National Academy of Engineering. *Rising Above the Gathering Revisted: Rapidly Approaching Category 5..* Washington, D.C.: National Academies Press, 2010. National Science Board (2007). A National Plan for Addressing the Critical Needs of the U.S. Science,

Date	Topic	Readings Due
		Technology, Engineering, and Mathematics Education System. National Governors Association: Innovation America: A Final Report (2007). America Competes Act. Located at http://thomas.loc.gov/cgi-bin/bdquery/z?d110:HR02272:@@@D&summ2=m&) A Nation at Risk: The Imperative for Educational Reform (1983). Located at http://www2.ed.gov/pubs/NatAtRisk/index.html. A Nation Accountable: Twenty-Five Years after a Nation At Risk (25 Years Later). Located at http://www2.ed.gov/rschstat/research/pubs/accountable/accountable.pdf International policies also will be reviewed.
Mar. 18	Spring Break (No Class)	**Leadership and Policy Case Analysis Due**
Mar. 25	Change	Dancy, M. & **Henderson, C.** (2008, October) Barriers and Promises in STEM Reform, *Commissioned Paper for National Academies of Science Workshop on Linking Evidence and Promising Practices in STEM Undergraduate Education*, Washington, DC, Oct 13-14, 2008. Axelrod, R.H., (2002). Why Change Management Needs Changing. *Reflections, 2,* 3, 46-57. Smith et al., (2004). Engineering Change. Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition, 18 pages. Bransford, J. (2007). Preparing People for Rapidly Changing Environments. Guest Editorial for the *Journal of Engineering Education.*

Date	Topic	Readings Due
April 1	Change	Hargrave, T.J., & Van de Ven, A.H. (2006). A Collective Action Model of Institutional Innovation. *Academy of Management Review, 31,* 4, 864-888. Duderstadt, J. (2008). *Engineering for a changing world* (Technical Report). Millennium Project, Ann Arbor: University of Michigan. Palmer, P.J. Divided No More: A Movement Approach to Educational Reform. Triarchy Press. Kotter, J. P. (1995). Leading Change: Why Transformation Efforts Fail. *Harvard Business Review OnPoint* (March-April), 1-10. Strebel, P. (1996). Why Do Employees Resist Change? *Harvard Business Review,* 74, 86-92. **Finalization of Synthesis Project Topic and Scope Due**
April 8	Change	Synthesis of Change Readings
April 15	Synthesis of Course Topics	**Group Change Deliverable Due In-Class**
April 22	Discussion & Presentation of Synthesis Assignments	
April 29	Course Wrap-Up	**Synthesis Assignment Due**

Text and/or Reading List

A primary text for the class is found below:

Vecchio, R.P. (Ed). (1997). Leadership: Understanding the dynamics of power and influence in organizations. Notre Dame, IN: Notre Dame Press. (Parts I and II).

All readings are identified in the table above.

Grading

In-Class Participation/Facilitation, 10%; Weekly Questions, 10%; Weekly Responses, 15%; Case Analysis of Leadership and Policy, 20%; Group Change Deliverable, 15%, and Synthesis Assignment 30%

ENE 50400
Leadership, Policy, and Change in Science, Technology, Engineering, and Mathematics (STEM) Education
Supporting document for Form 40G Rev 7/08

To: Purdue University Graduate Council

From: Faculty Member: Monica Cox
Department: Engineering Education
Campus: West Lafayette

Date: March 3, 2011

Subject: Proposal for New Graduate Course-Documentation Required by the Graduate Council to Accompany Registrar's Form 40G

For Reviewer's comments
(Select 1)
☐ Accept as is
☐ Requests additional information
☐ Disapproves of proposal

Reviewer :

Comments:

Contact for information if questions arise:
Name: Robin Adams
Phone Number: 6-3267
E-mail: rsadams@purdue.edu
Campus Address: West Lafayette

Course Subject Abbreviation and Number: Leadership, Policy, and Change in STEM Education ENE 50400

Course Title: Leadership, Policy, and Change in Science, Technology, Engineering, and Mathematics (STEM) Education

A. Justification for the Course:

Explanation of need for the course:

1. This course provides an opportunity for STEM students to engage in conversations about leadership, policy, and change. Unlike traditional courses that focus on general leadership, policy, and change practices, this course is taught in the context of STEM education. No such STEM course is offered in the College of Engineering, although national initiatives (e.g., the National Academy of Engineering's *Engineer of 2020*) and Purdue initiatives (i.e., Purdue's Engineer of 2020, the College of Engineering's Strategic Planning process, Global Policy Institute) highlight the importance of engineering students' engagement with leadership and policy.
2. This course provides a classroom context for engineering students to be introduced to the concepts of leadership, policy, and change. Examples are framed within the context of real cases and practical problems. An introduction to these topics is needed, since many engineers become leaders in industry or academic and play pivotal roles in the development of national and global STEM education policies and since less than 10% of elected U.S. government representatives hold STEM degrees.

Although many students will engage in experiences that prepare them to engage in leadership, policy, and change, they often do not have opportunities to receive feedback about leadership dynamics, the policy process, and ways to implement change. This course allows students to interact with their peers and with faculty who might provide constructive feedback for students who are developing as formal and informal leaders in STEM education and policy.

3. Since Purdue's College of Education no longer has a primary concentration in Higher Education Administration, this course allows STEM students to engage in leadership, policy, and change topics within the context of postsecondary education. Such a course has allowed approximately 50 students from the Colleges of Education, Technology, Engineering, and Science to engage in STEM education policy and to understand how such policies relate to their current and future research interests.

Justification for course level: The level of the proposed course is at the 50000-level because (1) this is a core course for ENE Ph.D. students (approximately 10-20 students per year) and for graduate and advanced undergraduate students with interests in leadership, policy, and change across the educational continuum, particularly within the context of their STEM disciplinary areas (approximately 5 students per year), (2) students are expected to produce high-quality, comprehensive deliverables that reflect their abilities to critique policies and cases; to identify diverse stakeholders and analyze the perspectives and needs of these stakeholders; and to process course literature in a way that adds to current knowledge about leadership, policy, and/or change in STEM education, and (3) students engage in reflective instructional activities that require them to synthesize knowledge and to present this information to their peers in a way that allows the class to engage in deep conversations about course content. This course is a fast-paced, reading intensive course that provides a broad overview of STEM leadership, policy, and change

B. Learning Outcomes and Method of Evaluation or Assessment:

Course objectives: As a result of taking this course, participants will develop the knowledge and skills to:

- Develop new ways to think about the leadership process
- Explore factors that contribute to effective and ineffective leadership within STEM organizations
- Explore and understand the political and policy dimensions of leadership via theoretical approaches to political and policy analysis
- Investigate the roles of STEM policy at local, state, national, and international levels
- Develop skills in analyzing policy alternatives and selecting "solutions" within the STEM education domain
- Evaluate barriers and enablers of diffusion of innovative processes
- Evaluate challenges for and models of systemic change
- Explore key aspects and applications of systemic (sustainable and deep) change of educational systems
- Explore negotiation strategies and ways to implement change within STEM environments

Student learning outcomes:

(1) Identify positive and negative aspects of leadership and apply leadership concepts within the context of STEM education

Instructional objectives: Opportunities to (1) read and critique cases of leadership across a variety of STEM environments and (2) apply leadership theories and vocabulary to the current STEM landscape via writing and discussion.

Mapping to course tasks: (1) Class discussion – participation and engagement, (2) in-class presentations, (3) leadership case analysis

(2) Analyze STEM policy at local, state, national, and international levels using appropriate policy frameworks.

Instructional objectives: Opportunities to (1) read and critique STEM policy documents offering recommendations for improving K-12 education and higher education, (2) understand basic principles of policy analysis and the roles of diverse stakeholders in the policy process, and (3) identify the relationship between research and policy.

Mapping to course tasks: (1) Class discussion – participation and engagement, (2) in-class presentations, (3) analyses of STEM policies across the educational continuum via a group deliverable

Link to ENE Graduate Competencies: Synthesize knowledge, Communicate knowledge, Think critically and reflectively, Explain and Critique Education Policy

(3) Identify change models and the applicability of these models within the context of STEM education

Instructional objectives: Opportunities to (1) identify the pros and cons of change models and apply models to STEM education and (2) develop strategies for implementing change in educational systems and within STEM environments

Mapping to course tasks: (1) Class discussion – participation and engagement, (2) in-class presentations, (3) develop of a synthesis projects that propose changes to a current system or develop new models for STEM education

Link to ENE Graduate Competencies: Synthesize knowledge, Communicate knowledge, Think critically and reflectively, Explain and Critique Education Policy

Methods of evaluation and assessment: Grading criteria - Papers and tasks (see table below for Grading Criteria)

Grading criteria used to assess students and articulate final grades are shown in the table below.

Grading Tasks	Portion of total grade	Assessment
In-Class Participation/ Facilitation	10%	Students will receive credit for attending class and for actively participating in all discussion and facilitation activities. This should be demonstrated by the quality of discussions, prior preparation for these discussions, and overall engagement in the course.

Weekly Questions	10% (submitted weekly but averaged over the semester)	Before each class, students are required to submit via the Blackboard Discussion tool a typed list of two questions or integrative statements based upon assignments from the previous week. Sample questions should not represent basic, fact-based questions or definitions but higher order questions that allow the class to engage in deep discussion about course content. Sample questions might compare or contrast differences in methods, theories, or perspectives mentioned in the readings, or they might ask students to elaborate on complex theories or policies presented in the readings. The instructor will compile all students' questions and will bring a hard copy of these questions to class. Any question or statement may be used as a point of discussion during class. Students will receive 0 points if they do not submit questions, partial credit (i.e., 5 points) if they submit questions that do not ask higher order questions about course readings, and full credit (10 points) for their submissions if they submit high quality questions that demonstrate engagement with readings and the creation of higher order questions for the class.
Weekly Reponses	15% (submitted weekly but averaged over the semester)	Between the class when students submitted their two questions and the next class, students must submit via the Blackboard Assignments tool a typed response to any two questions that were presented in the class the previous week. This response is expected to be one to two paragraphs in length. Responses also should refer to course literature and/or other pertinent examples, not just students' personal stories or experiences. After responding to the two questions, you should answer the following question: "What did the reading mean to me?" Students will receive 0 points if they do not submit responses, partial credit (i.e., 5 points) if they submit responses that do not refer to appropriate literature and/or other pertinent examples, and full credit

		(10 points) for their submissions if they submit high quality responses that demonstrate engagement with readings and thoughtful responses to selected questions.
Case Analysis of Leadership and Policy	20%	For this assignment, students will be assigned a portion of a STEM case and will write an 8+ page, doubled-spaced critique of this case. Students are expected to answer the following questions at a minimum: What are some of the current policies within the case? If applicable, select policy changes that you believe would make a significant improvement in some component of the case, and justify the proposed changes in policies. What support do you think would be necessary to achieve the desired end? How would you compare your policy change and your strategy with one or more of those within class articles and texts? What role does leadership play within this case? What might you do if you were a leader within this scenario? You may reference class articles and additional texts to support your points. A breakdown of points for the assignment are found below (total 20 points): (1) STEM Case Description (8 points) (2) Explanation of and Reference to Current Policies (4 points) (3) Description of Necessary Policy Changes and a Justification of Policy Changes (4 points) (4) Explicit Description of Case Elements to Course Content and to Other Relevant Literature (4 points)
Group Change Deliverable	15%	*Group Change Deliverable* As a group, you will explore the role of change within the leadership and policy case(s) submitted earlier in the semester using multiple change models. Use language from this text to discuss how your proposed policies might be implemented. How might you have to alter your leadership strategies or policies to promote this change or changes? The assignment must be 8+ page, doubled-spaced pages and is due on **April 15,**

		2009. Note that this is part of a larger case deliverable.
Synthesis Assignment	30%	*Synthesis Assignment* This synthesis assignment will document the content and context that you have chosen to highlight in the areas of Leadership, Policy, and/or Change. It is not tightly specified in an effort to provide flexibility and opportunity for each of you to do something valuable for you that is connected to the course. Talk with one another and with the instructor to develop your ideas *early* in the semester. Using a call for proposals, journal or proceedings guidelines, or some other external solicitation, you will develop a deliverable that could be disseminated to a national or international audience. Examples of possible synthesis assignments are listed below. **Example 1:** Write a literature synthesis that could be published within a journal such as *The Leadership Quarterly*. Using the "Guide for Authors," format your paper appropriately and submit work that would be of interest to the targeted audience. **Example 2:** Find a Request for Proposals (RFP), and write a proposal that will explore leadership, policy, or change topics within your targeted population. One solicitation that might be of interest could be the National Science Foundation's (www.nsf.gov) Course, Curriculum, Laboratory, and Instruction Phase 1 solicitation. **Example 3:** Write a paper that explores the themes of leadership, policy, and/or change within a current research or thesis project.

Method of instruction: Lecture

This course is comprised of discussion that is informed from weekly readings, weekly reflections that allow students to engage more deeply with course materials, and weekly in-

class, small group laboratories that allow students to apply theoretical concepts that they have learned throughout the semester. Such activities help students to identify the educational topics (e.g. engineers as academic leaders, the pros and cons of "No Child Left Behind") and the projects (e.g., a review of literature, article critique) that can connect the themes of leadership, policy, and change to their current and future STEM education interests. Students receive summative feedback from the instructor and formative feedback from their peers throughout the course

The course is divided into three distinct themes- (1) leadership, (2) policy, and (3) change. To inform their knowledge of the themes in STEM education, students read literature from disciplines such as organizational management, engineering, and education. Although many of the seminal pieces have been written in non-engineering disciplines, this course requires that students apply knowledge from these disciplines to a new realm- STEM education. By referencing works from other disciplines, students obtain foundational knowledge of course themes and can enroll in complementary courses such as public policy, education policy, organizational change, management, or business.

C. Prerequisite(s):

There are no course prerequisites.

D. Course Instructor(s):

Course Instructor(s):
Dr. Monica F. Cox, Assistant Professor, School of Engineering Education

Dr. Cox is currently a member of the Graduate Faculty.

E. Course Outline:

Course Outline:
The tentative syllabus below describes course topics and indicates the amount of time devoted to leadership, policy, and change.

TENTATIVE COURSE SCHEDULE/ TOPICS

Date	Topic	Readings Due
Jan. 21	Introductions, course syllabus, course overview, and introduction to leadership, policy, and change	
Jan. 28	Leadership	Vecchio, R.P. (Ed). (1997). Leadership: Understanding the dynamics of power and influence in organizations. Notre Dame, IN: Notre Dame Press. (Parts I and II) Farr, J.V., Walesh, S.G., & Forsythe, G.B. (1997). Leadership development for engineering managers. *Journal of Management in Engineering, 13,* 4, 38-41.

		Congressional Research Service (CRS) (2007). *Science, Technology, Engineering, and Mathematics (STEM) Education: Background, Federal Policy, and Legislative Action*
Feb. 4	Leadership/ STEM Education	Vecchio- Parts III and IV U.S. Department of Education. (2007). *Report of the Academic Competitive Council,* Washington, DC. Graham, R., Crawley, E., & . Mendelsohn, B.R. (2009). *Engineering Leadership Education: A Snapshot Review of International Good Practice.* White Paper sponsored by the Bernard M. Gordon-MIT Engineering Leadership Program.
Feb. 11	Leadership	Vecchio- Part V (excluding Rafferty p. 434), Part VI (p. 507-562) Dunn, K. (2009). The Case of Leadership Skills Courses in Engineering Curriculum. Proceedings of the 2009 Midwest Section Conference of the American Society of Engineering Education. Zoli et al., (2008). Engineering Women and Leadership. Morgan and Claypool Publishers.
Feb. 18	Leadership	NSF Engineering and Science Indicators 2010 (You are responsible for reading the overview and the content in your chapter only). http://www.nsf.gov/statistics/seind10/ Each student will present a 5-10 minute summary about one of the chapters. This presentation should present an overview of the major points within your chapter and a connection of this content to leadership (refer to reading thus far). Provide any criticisms about the data or findings, and identify future directions for STEM education. **One-Page Proposal of Synthesis Project Due**
Feb. 25	Policy	Ripley, R.B. The Nature of the Policy Process. (1997). In *Public Policy and Higher Education.* (Eds.) (Goodchild et. al.). ASHE Readers Series, pp. 3-16. Lindblom, C.E. & Woodhouse, E.J. (1992). The Challenges Facing Policy Making. In *The Policy-Making Process.* (3rd Ed.) Prentice Hall: NJ. pp. 2-12. McDonnell, L.M., & Elmore, R.F. (1987). Getting the Job Done: Alternative Policy Instruments. *Educational Evaluation and Policy Analysis, 9,* 2, pp. 133-152.

		Additional Policy Readings TBD.
Mar. 4	Policy	Gill, J.I., & Saunders, L. (1997). Conducting Policy Analysis in Higher Education. In *Public Policy and Higher Education.* (Eds.) (Goodchild et. al.). ASHE Readers Series, pp. 225-233. Hanushek, E.A. (2005), Policy Analysis: Is It, or Could it Be the Fifth Estate? Association for Public Policy Analysis and Management, 20 pages. McCarthy, M.M., & Hall, G.C. (1989). The Emergence of University-Based Education Policy Centers. ERIC/CEM Trends and Issues Series, Number 2, 23 pages. BEST: Building Engineering and Science Talent. (2004a.) *A Bridge for All: Higher Education Design Principles to Broaden Participation in Science, Technology, Engineering, and Mathematics.* San Diego, Calif.: BEST, BEST: Building Engineering and Science Talent. (2004b). *The Talent Imperative: Diversifying America's Science and Engineering Workforce.* San Diego, Calif.: BEST.
Mar. 11	Policy	National Academy of Engineering. *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future.* Washington, D.C.: National Academies Press, 2006. National Academy of Engineering. *Rising Above the Gathering Revisted: Rapidly Approaching Category 5..* Washington, D.C.: National Academies Press, 2010. National Science Board (2007). A National Plan for Addressing the Critical Needs of the U.S. Science, Technology, Engineering, and Mathematics Education System. National Governors Association: Innovation America: A Final Report (2007). America Competes Act. Located at http://thomas.loc.gov/cgi-bin/bdquery/z?d110:HR02272:@@@D&summ2=m&) A Nation at Risk: The Imperative for Educational Reform (1983). Located at http://www2.ed.gov/pubs/NatAtRisk/index.html. A Nation Accountable: Twenty-Five Years after a Nation

		At Risk (25 Years Later). Located at http://www2.ed.gov/rschstat/research/pubs/accountable/accountable.pdf International policies also will be reviewed.
Mar. 18	Spring Break (No Class)	**Leadership and Policy Case Analysis Due**
Mar. 25	Change	Dancy, M. & **Henderson, C.** (2008, October) Barriers and Promises in STEM Reform, *Commissioned Paper for National Academies of Science Workshop on Linking Evidence and Promising Practices in STEM Undergraduate Education*, Washington, DC, Oct 13-14, 2008. Axelrod, R.H., (2002). Why Change Management Needs Changing. *Reflections, 2,* 3, 46-57. Smith et al., (2004). Engineering Change. Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition, 18 pages. Bransford, J. (2007). Preparing People for Rapidly Changing Environments. Guest Editorial for the *Journal of Engineering Education.*
April 1	Change	Hargrave, T.J., & Van de Ven, A.H. (2006). A Collective Action Model of Institutional Innovation. *Academy of Management Review, 31,* 4, 864-888. Duderstadt, J. (2008). *Engineering for a changing world* (Technical Report). Millennium Project, Ann Arbor: University of Michigan. Palmer, P.J. Divided No More: A Movement Approach to Educational Reform. Triarchy Press. Kotter, J. P. (1995). Leading Change: Why Transformation Efforts Fail. *Harvard Business Review OnPoint* (March-April), 1-10. Strebel, P. (1996). Why Do Employees Resist Change? *Harvard Business Review,* 74, 86-92. **Finalization of Synthesis Project Topic and Scope Due**
April 8	Change	Synthesis of Change Readings
April 15	Synthesis of Course Topics	**Group Change Deliverable Due In-Class**
April 22	Discussion & Presentation of Synthesis Assignments	
April 29	Course Wrap-Up	**Synthesis Assignment Due**

F. Reading List (including course text):

Reading List (including course text):
All readings are identified in the syllabus above.

G. Library Resources

Library resources:
All readings are available on Blackboard Vista.