

Graduate Council Doc. No. 10-24c

DEPARTMENT School of Engineering Education

EFFECTIVE SESSION Fall 2010 *SP 2011* Fall 2011

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  |

<b>PROPOSED:</b>		<b>EXISTING:</b>		<b>TERMS OFFERED</b> Check All That Apply:		
Subject Abbreviation	ENE	Subject Abbreviation		<input type="checkbox"/> Summer	<input checked="" type="checkbox"/> Fall	<input type="checkbox"/> Spring
Course Number	55400	Course Number		<b>CAMPUS(ES) INVOLVED</b>		
Long Title	Globalization and Engineering			<input type="checkbox"/> Calumet	<input type="checkbox"/> N. Central	
Short Title	Globalization and Engineering			<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)						

<b>CREDIT TYPE</b>		<b>COURSE ATTRIBUTES: Check All That Apply</b>			
1. Fixed Credit: Cr. Hrs.	3	1. Pass/Not Pass Only	<input type="checkbox"/>	6. Registration Approval Type	Department <input type="checkbox"/> Instructor <input checked="" type="checkbox"/>
2. Variable Credit Range:		2. Satisfactory/Unsatisfactory Only	<input type="checkbox"/>	7. Variable Title	<input type="checkbox"/>
Minimum Cr. Hrs.		3. Repeatable	<input type="checkbox"/>	8. Honors	<input type="checkbox"/>
(Check One) To	<input type="checkbox"/> Or <input type="checkbox"/>	Maximum Repeatable Credit:	<input type="checkbox"/>	9. Full Time Privilege	<input type="checkbox"/>
Maximum Cr. Hrs.		4. Credit by Examination	<input type="checkbox"/>	10. Off Campus Experience	<input type="checkbox"/>
3. Equivalent Credit: Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/>	5. Special Fees	<input type="checkbox"/>		
4. Thesis Credit: Yes	<input type="checkbox"/> No <input checked="" type="checkbox"/>				

Schedule Type	Minutes Per Mtn	Meetings Per Week	Weeks Offered	% of Credit Allocated	Cross Listed Courses
Lecture	50	3	16	100	
Recitation					
Presentation					
Laboratory					
Lab Prep					
Studio					
Distance					
Clinic					
Experiential					
Research					
Ind. Study					
Pract/Observ					

RECEIVED  
 OFFICE OF THE REGISTRAR  
 2011 MAR 10 AM 10:28

**COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):**  
 The focus is on the multifaceted dynamics of globalization, and its impact on engineering practice and the lives and education of engineers. The course emphasizes engineering and globalization from the perspectives of the emerging Asian economies and Europe as well as the United States. This course is designed for practicing engineers and engineering educators. It is taught within a learner-centric, highly interactive, collaborative learning environment within which students are expected to learn from the experiences and thinking of each other, as well as from the instructor and other course resources. The course places emphasis on reading, writing, web-based research, and discussion. Prerequisites: (1) ~~Students must have a BS degree in engineering or computer science.~~ (2) Students are recommended (but not required) to have a minimum of two years work experience as a practicing engineer and strong communication skills (self-assessed). **Professor Harris.**

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	<i>R. C. C. 9-7-2010</i>	Date
North Central Faculty Senate Chair	Date	Vice Chancellor for Academic Affairs	Date	APPROVED 2/17/11	
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date	Date Approved by Graduate Council	
Graduate Area Committee Convener	Date	Graduate Dean	Date	<i>2/18/11</i>	
				Graduate Council Secretary	Date
				<i>Sandra Schaefer</i>	Date
				West Lafayette Registrar	Date
				<i>3/11/11</i>	

*3/11/11*



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

Print Form

EFD 25-09

DEPARTMENT School of Engineering Education

EFFECTIVE SESSION Fall 2010 SP 2011

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  |

<b>PROPOSED:</b> Subject Abbreviation <u>ENE</u> Course Number <u>55400</u> Long Title <u>Globalization and Engineering</u> Short Title <u>Globalization and Engineering</u>	<b>EXISTING:</b> Subject Abbreviation _____ Course Number _____	<b>TERMS OFFERED</b> Check All That Apply: <input type="checkbox"/> Summer <input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring
Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)		<b>CAMPUS(ES) INVOLVED</b> <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

<b>CREDIT TYPE</b> 1. Fixed Credit: Cr. Hrs. <u>3</u> 2. Variable Credit Range: Minimum Cr. Hrs. _____ (Check One) To <input type="checkbox"/> Or <input type="checkbox"/> Maximum Cr. Hrs. _____ 3. Equivalent Credit: Yes <input type="checkbox"/> No <input type="checkbox"/> 4. Thesis Credit: Yes <input type="checkbox"/> No <input type="checkbox"/>	<b>COURSE ATTRIBUTES: Check All That Apply</b> 1. Pass/Not Pass Only <input type="checkbox"/> 2. Satisfactory/Unsatisfactory Only <input type="checkbox"/> 3. Repeatable <input type="checkbox"/> Maximum Repeatable Credit: _____ 4. Credit by Examination <input type="checkbox"/> 5. Special Fees <input type="checkbox"/> 6. Registration Approval Type Department <input type="checkbox"/> Instructor <input type="checkbox"/> 7. Variable Title <input type="checkbox"/> 8. Honors <input type="checkbox"/> 9. Full Time Privilege <input type="checkbox"/> 10. Off Campus Experience <input type="checkbox"/>
--	--

Schedule Type	Minutes Per Mta 50	Meetings Per Week 1	Weeks Offered 16	% of Credit Allocated 100	Cross-Listed Courses _____ _____ _____ _____ _____	
Lecture						
citation						
presentation						
Laboratory						
Lab Prep						
Studio						
Distance						
Clinic						
Experiential						
Research						
Ind. Study						
Pract/Observ						

**COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):**  
The focus is on the multifaceted dynamics of globalization, and its impact on engineering practice and the lives and education of engineers. The course emphasizes engineering and globalization from the perspectives of the emerging Asian economies and Europe as well as the United States. This course is designed for practicing engineers and engineering educators. It is taught within a learner-centric, highly interactive, collaborative learning environment within which students are expected to learn from the experiences and thinking of each other, as well as from the instructor and other course resources. The course places emphasis on reading, writing, web-based research, and discussion. Prerequisites: (1) Students must have a BS degree in engineering or computer science, (2) Students are recommended (but not required) to have a minimum of two years work experience as a practicing engineer and strong communication skills (self-assessed).

Calumet Department Head _____ Date <u>8/25/10</u>	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. Cipra</u> 9-7-2010 Undergrad Curriculum Committee _____ Date _____
North Central Faculty Senate Chair _____ Date _____	Vice Chancellor for Academic Affairs _____ 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

File sent 10/12/10



**To:** The Faculty of the College of Engineering  
**From:** School of Engineering Education  
**Subject:** New Graduate Course, ENE 55400

The faculty of the School 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 55400 Globalization and Engineering**  
Sem. 1, Class 3, Cr. 3.

**Prerequisite:**

Graduate standing and consent of the instructor. Preference is given to students with an engineering background and professional experience. Students who successfully complete ENE55400 Globalization and Engineering cannot subsequently enroll in ENE 55300.

**Course description:**

Focus is on the dynamics of globalization, and its impact on engineering practice and the education of engineers. Includes perspectives from the emerging Asian economies and Europe as well as the United States. Topics include: global migration of highly-skilled people including engineers, flow of capital and the globalization of R&D investment, world trade of commodities and high-tech products, global supply chains and the process of innovation, role of multinational corporations, intellectual property and the global spread of technology, global outsourcing and off-shoring of engineering jobs and services, global convergence of engineering education and training. This course is designed for practicing engineers and engineering educators. It is taught within a learner-centric, highly interactive learning environment within which students are expected to learn from each other as well as from the instructor and other course resources. The course places emphasis on reading, writing, web-based research, and discussion. It includes guest speakers representing industry and academia from all over the world.

**Reasons:**

Globalization is the most, or one of the most, influential forces of the first half of the 21st century. All students, regardless of discipline, benefit from an understanding of this force and its impact on their lives and professions. Engineers, in particular, increasingly function in a globalized work environment. To lead and excel, engineers must understand globalization and incorporate that knowledge in their educational and career choices, as well as within their daily professional activities. This course provides a framework on which engineers can expand their global competence. This course is designed for professionally employed engineering graduate students from all disciplines, and at graduate students planning a career in engineering education. The prerequisite is needed due to the interactive, collaborative learning methodologies used in the course; at least two-thirds of the class must have significant experience as a practicing engineer or



engineering educator. In contrast with ENE 55300 (Introduction to Globalization and Engineering), which is a one credit unit seminar course meant to introduce interested students to the topic, ENE 55400 (Globalization and Engineering) is a three unit course in which students pursue the topic in substantial depth. The two courses target different student populations of interest and it is not intended that any student take both courses.

This course was previously offered as ENE 595Q – Globalization and Engineering in Summer 2007 (21 registered students) and Summer 2008 (20 registered students) and ENE 595E – Globalization and Engineering in Fall 2007 (7 registered students). Average evaluation of course = 4.7 and average evaluation of instructor = 4.8.

---

Kamyar Haghighi, Head  
Engineering Education





Supporting Documentation

1. Level: Graduate
2. Course Instructors: Dale Harris
3. Course Outline

***Learning Outcomes:***

- Increased global awareness
- Knowledge of the dynamics of globalization as an economic and social process
- Knowledge of how globalization is studied and characterized by economists, political scientists, and sociologists
- Recognition of engineering and engineers as important social and economic actors
- Understanding the global as the horizon of interest to the engineering profession in the 21st century
- Increased understanding of the nature and roles of engineering education and life-long learning within the globalization dynamic
- Advanced understanding of the innovation process within a global enterprise including contrasting theories and the ability to analyze specific cases
- Knowledge of the engineering tools, processes, and attributes required to lead and innovate within a rapidly globalizing profession
- Knowledge of the engineering profession, engineering education, and globalization from the perspectives of countries beyond the United States, particularly Europe and the emerging economies of Asia
- Increased life-long learning skills

***Textbook:***

- The World is Flat by Thomas Friedman (Farrar, Strauss and Giroux, 2007)
- From Global to Metanational by Yves Doz, Jose Santos, and Peter Williamson (Harvard Business School Press, 2001)
- The Engineer of 2020 by the National Academy of Engineering (The National Academies Press, 2004)

***Syllabus:*** This syllabus is modeled after the course as it was taught in Summer 2007. Because of the use of case studies and the participation of guest speakers, the course syllabus would be different in details each time it's taught

**Week 1**

- Lecture topic: **Introduction to Globalization** (presented by instructor)
- Reading: pages 1 - 30 of The World is Flat



**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 4 discussion sessions throughout the week.

**Week 2**

**Lecture topic:** **19th Century Globalization** (presented by instructor)

**Reading:** pages 31 - 59 of *The World is Flat*

**Writing:** Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures

**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.

**Week 3**

**Lecture topic:** **20th and 21st Century Globalization** (presented by instructor)

**Lecture topic:** **Educating the Global Engineer** (presented by Professor Dan Hirleman, Purdue University)

**Reading:** pages 60 - 120 of *The World is Flat*

**Reading:** pages 1 - 40 of *From Global to Metanational*

**Writing:** Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures

**Writing:** Selected students are assigned to write 2 page summaries of discussions held the previous week

**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.

**Week 4**

**Lecture topic:** **Global Value Chains and Attributes of Engineers** (presented by instructor)

**Reading:** pages 121 - 150 of *The World is Flat*

**Reading:** pages 41 - 62 of *From Global to Metanational*

**Reading:** pages 1 - 13 of *The Engineer of 2020*

**Writing:** Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures

**Writing:** Selected students are assigned to write 2 page summaries of discussions held the previous week

**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week

**Research:** Students will begin independent research into a subject of their choice, relevant to the course. The research subject must be



approved by the instructor and must involve significant literature review and research on the WWW.

#### **Week 5**

- Lecture topic:** **Globalization of Engineering Practice** (presented by instructor)
- Reading:** pages 151 - 179 of the *The World is Flat*
- Reading:** pages 63 - 82 of *From Global to Metanational*
- Reading:** pages 14 - 25 of *The Engineer of 2020*
- Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week
- Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week
- Research:** Students will begin independent research into a subject of their choice, relevant to the course. The research subject must be approved by the instructor and must involve significant literature review and research on the WWW.

#### **Week 6**

- Lecture topic:** **Asia and the Flat World** (presented by instructor)
- Reading:** pages 180 - 239 of the *The World is Flat*
- Reading:** pages 83 - 123 of *From Global to Metanational*
- Reading:** pages 26 - 51 of *The Engineer of 2020*
- Writing:** Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures
- Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week
- Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week
- Research:** Students continue independent research into a subject of their choice, relevant to the course

#### **Week 7**

- Lecture topic :** **European Engineering Education in the Flat World** (presented by Professor Bjorn Pherson, Royal Institute of Technology, Sweden)
- Lecture:** **Managing Global Innovation** (presented by Gopichand Katragadda, GE India Technology Center)
- Reading:** pages 240 - 270 of the *The World is Flat*
- Reading:** pages 124 - 154 of *From Global to Metanational*
- Reading:** pages 52 - 64 of *The Engineer of 2020*



- Writing: Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures
- Writing: Selected students are assigned to write 2 page summaries of online discussions held the previous week
- Discussion: Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.
- Research: Students continue independent research into a subject of their choice, relevant to the course

### Week 8

- Lecture topic: **Educating the Global Engineer Through Globally Distributed Student Design Teams** (presented by Dr. Renate Fruchter, Stanford University)
- Reading: pages 271 - 299 of the *The World is Flat*
- Reading: pages 155 - 184 of *From Global to Metanational*
- Reading: pages 65 - 76 of *The Engineer of 2020*
- Writing: Selected students are assigned to write 2 page summaries of online discussions held the previous week
- Discussion: Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.
- Research: Students continue independent research into a subject of their choice, relevant to the course

### Week 9

- Lecture topic: **Engineering Perspectives on The Global Economy** (presented by instructor)
- Reading: pages 300 - 359 of the *The World is Flat*
- Reading: pages 185 - 225 of *From Global to Metanational*
- Reading: finish the book, *The Engineer of 2020*
- Writing: Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures
- Writing: Selected students are assigned to write 2 page summaries of online discussions held the previous week
- Discussion: Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.
- Research: Students continue independent research into a subject of their choice, relevant to the course

### Week 10

- Lecture topic: **Global Governance** (presented by instructor)





- Reading:** pages 360 - 390 of the *The World is Flat*  
**Writing:** Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures  
**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week  
**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.  
**Research:** Students continue independent research into a subject of their choice, relevant to the course

#### **Week 11**

- Lecture topic:** **The Global Engineering Enterprise: Case Studies** (presented by instructor)  
**Reading:** pages 391 - 420 of the *The World is Flat*  
**Reading:** complete the book, *From Global to Metanational*  
**Writing:** Each student writes a 3 page essay on a topic inspired by the week's reading assignments or lectures  
**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week  
**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.  
**Research:** Students continue independent research into a subject of their choice, relevant to the course

#### **Week 12**

- Lecture topic:** **Engineering Innovation Within the Global Enterprise** (presented by instructor)  
**Reading:** Complete the book, *The World is Flat*  
**Writing:** Selected students are assigned to write 2 page summaries of discussions held the previous week  
**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.  
**Research:** Students complete their independent research project

#### **Week 13**

- Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week



**Writing:** Each student completes and submits a 10 page written report on the subject of their independent research. These are posted online.  
**Presentation:** Each student makes a 30 minute oral presentation of their independent research, complete with PowerPoint slides. These are recorded and posted online. Each presentation is followed by a 10 - 15 discussion session.

**Week 14**

**Lecture topic:** **Case Study: Infosys and the Indian Software Industry** (presented by Peter Tannenwald of Infosys Technologies)  
**Writing:** Each student is to read the written reports and listen to the oral presentations of several assigned classmates. They are to write a 2 page response to each. The responses are not to be critiques. Rather, they are to provide additive content based on experience and/or knowledge gained in the course.  
**Discussion:** Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.

**Week 15**

**Lecture topic:** **Course Summary and Conclusion** (presented by instructor)  
**Writing:** Each student is to write a 3 page essay either on Globalization and Engineering, or on their key learnings from the course.

**Grading:**

Participation and Quality of Discussion:	30%
Weekly Writing Assignments:	30%
Final Report on Research Topic:	20%
Oral Presentation of Research Topic:	20%

Students will receive a grade as well as feedback from the instructor on each writing assignment. Students will receive weekly comments (either oral or in writing) from the instructor regarding issues raised during the discussion sessions.

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

ECC Minutes #20  
Date 3/23/10  
Chairman ECC R. Cipra



**Supporting Document for a New Graduate  
Course**

**To:** Purdue University Graduate Council

**From:** Faculty Member: Dale Harris  
Department: Engineering Education  
Campus: 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)
<input type="text"/>
Reviewer:
Comments:

**Contact for information if questions arise:**

Name:	<u>Cindey Hays (temporary)</u>
Phone Number:	<u>494-3884</u>
E-mail:	<u>isenberg@purdue.edu</u>
Campus Address:	<u>ARMS 1321</u>

Course Subject Abbreviation and Number: ENE 55400

Course Title: Globalization and Engineering

**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 fields of study and/or areas of specialization, 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**



- 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**

**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](http://www.gradschool.purdue.edu/downloads/Graduate_School_Policies_and_Procedures_Manual.pdf)





## **ENE 55400 Globalization and Engineering (three credits)**

### **Course description:**

The focus is on the multifaceted dynamics of globalization, and its impact on engineering practice and the lives and education of engineers. The course emphasizes engineering and globalization from the perspectives of the emerging Asian economies and Europe as well as the United States. Topics include: globalization as studied by economists, sociologists, and political scientists; global migration of highly-skilled people including engineers; free flow of capital and the globalization of R&D investment; world trade of commodities and high-tech products; global value chains and the process of innovation; role of multinational and metanational corporations; role of intellectual property and the global spread of technology; global outsourcing and off-shoring of engineering jobs and services; global convergence of engineering education and life-long learning. This course is designed for practicing engineers and engineering educators. It is taught within a learner-centric, highly interactive, collaborative learning environment within which students are expected to learn from the experiences and thinking of each other, as well as from the instructor and other course resources. The course places emphasis on reading, writing, web-based research, and discussion. It includes guest speakers representing industry and academia from all over the world.

### **A. Justification for the Course**

- Globalization is the most, or one of the most, influential forces of the first half of the 21st century. All students, regardless of discipline, benefit from an understanding of this force and its impact on their lives and professions. Engineers, in particular, will increasingly function in a globalized work environment. To lead and excel, engineers must understand the dynamics of globalization and incorporate that knowledge in their educational and career choices, as well as within their daily professional activities. This course is designed for graduate students, preferably with a minimum of two years full-time work experience as a practicing engineer and exposure to global engineering issues in the workplace. The course builds on practical experience by significantly deepening and broadening the student's knowledge of globalization and its impact on the engineering profession. The course is designed to prepare the student for positions of greater responsibility and leadership.
- The subject matter of this course is presented and discussed at a level that assumes the student already has had exposure to the topics covered obtained academically or more likely through practical work experience. The course is taught in a manner that assumes the student has advanced communication skills (writing, presentation, discussion) and significant experience researching issues and topics using the world wide web. The course is not appropriate for undergraduate students who will not have the portfolio of skills and knowledge required for success in the course. This course was previously offered as ENE 595Q – Globalization and Engineering in Summer 2007 (20 registered students), Summer 2008 (21 registered students) and Summer 2009 (20 registered students). Average



evaluation of course = 4.8 and average evaluation of instructor = 4.8. In the three experimental offerings of the course, enrollments were capped at 20.

## **B. Learning Outcomes and Methods of Evaluation or Assessment**

### ***Learning outcomes:***

- Increased global awareness
- Knowledge of the dynamics of globalization as an economic and social process including contrasting theories and interpretations of events
- Knowledge of how globalization is studied and characterized by economists, political scientists, and sociologists
- Ability to interpret studies and research on globalization
- Increased understanding of the nature and roles of engineering education and life-long learning within the globalization dynamic
- Advanced understanding of the innovation process within a global enterprise including contrasting theories and the ability to analyze specific cases
- Increased ability to lead and innovate within a rapidly globalizing profession
- Knowledge of the engineering profession, engineering education, and globalization from the perspectives of countries beyond the United States, particularly perspectives from Europe and the emerging economies of Asia

### ***Methods of evaluation of learning outcomes:***

Evaluation of learning outcomes is done by:

- observation of student engagement and discussions - students carry out discussions both live in class and asynchronously online. The discussion questions posed to the students are designed to promote the learning objectives. All discussions are monitored and facilitated by the instructor.
- observations from extensive instructor interaction and discussion with individual students (this student-instructor interaction is extensive and built into the course)
- student written work - students are asked to research multiple globalization issues and events and write reports built around the learning objectives above. Fifteen written reports are required of each student. As a collected work, these reports provide the instructor insight into the progress of each student in reaching the learning objectives
- end of course survey

### ***Grading:***

- 25% Discussion - quantifiable participation in discussion is required of each student each week; a set of discussion questions



are presented to the class each week; each question requires an increase in student knowledge gained via independent research done using the world wide web; the student is asked to integrate what they learned with their own personal experience and with what they've learned from the required texts; students are directed to reflect that integration within their discussion comments; the discussion grade reflects the quality of the students participation

- 50% Writing - there are seven writing assignments of three pages each plus eight writing assignments of two pages each
- 25% Oral Presentation - a 30 minute presentation is required on a topic relevant to globalization and engineering, and researched by the student throughout the length of the course

Students will receive a grade as well as feedback from the instructor on each writing assignment. Students will receive weekly comments (either oral or in writing) from the instructor regarding issues raised during the discussion sessions.

#### **C. Prerequisites:**

- Students must have a BS degree in engineering or computer science
- Students are recommended (but not required) to have a minimum of two years work experience as a practicing engineer and strong communication skills (self-assessed). Experience during the experimental offerings of this course suggests that students without work experience are at a disadvantage in this course.

#### **D. Course Instructor:**

Dale Harris

Professor, Engineering Education

Currently a member of the Graduate Faculty

#### **E. Course Outline:**

The syllabus below describes the course topics and indicates the relative amount of time devoted to each. Guest speakers will vary year-to-year. Those listed below participated in the experimental offering of the course in Summer 2009.

##### **Week 1**

Lecture Topics:

**Introduction to the Course; Introduction to Globalization**

Reading:

pages 1 - 30 of *The World is Flat*

Discussion:

Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.



**Week 2**

**Lecture topics:** **History of Globalization**  
**Reading:** pages 31 - 59 of The World is Flat  
**Writing:** Selected students are assigned to write 2 page summaries of discussions held the previous week  
**Writing:** Each student writes a 3 page essay on a topic assigned by the instructor  
**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Week 3**

**Lecture topics:** **Global Innovation in the Flat World**  
**Guest Instructor:** Gopichand Katragadda  
General Manager, Engineering Operations  
GE Energy - India  
Bangalore, India  
**Reading:** pages 60 - 120 of the The World is Flat  
**Reading:** pages 1 - 40 of From Global to Metanational  
**Writing:** Selected students are assigned to write 2 page summaries of discussions held the previous week  
**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Week 4**

**Lecture topics:** **Global Governance**  
**Case Study:** Globalization at Ingersoll Rand  
**Reading:** pages 121 - 150 of the The World is Flat  
**Reading:** pages 41 - 62 of From Global to Metanational  
**Reading:** pages 1 - 13 of The Engineer of 2020  
**Writing:** Selected students are assigned to write 2 page summaries of discussions held the previous week  
**Writing:** Each student writes a 3 page essay on a topic assigned by the instructor  
**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.  
**Research:** Students will begin independent research into a subject of their choice, relevant to the course. The research subject must be approved by the instructor and must involve significant literature review and research on the WWW.

**Week 5**

**Lecture topics:** **Globalization of R&D Investment**  
**Case Study:** Globalization of the Chinese Telecommunications Industry  
**Reading:** pages 151 - 179 of the The World is Flat  
**Reading:** pages 63 - 82 of From Global to Metanational  
**Reading:** pages 14 - 25 of The Engineer of 2020  
**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week  
**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.  
**Research:** Students continue independent research into a subject of their choice, relevant to the course. The research subject must be approved by the instructor and must involve significant literature review and research on the WWW.





### **Week 6**

**Lecture topics:** **Global Dispersion of Engineering Jobs and Migration of Highly Skilled People**

**Case Study:** Globalization of Agricultural and Biological Sustainability

**Reading:** pages 180 - 239 of the The World is Flat

**Reading:** pages 83 - 123 of From Global to Metanational

**Reading:** pages 26 - 51 of The Engineer of 2020

**Writing:** Each student writes a 3 page essay on a topic assigned by the instructor

**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week

**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Research:** Students continue independent research into a subject of their choice, relevant to the course

### **Week 7**

**Lecture topics:** **Globalization of Engineering and Engineering Education in Europe**

**Guest Instructor:** Bjorn Pehrson  
Professor and Previous Chair, Department of Teleinformation  
The Royal Institute of Technology  
Stockholm, Sweden

**Reading:** pages 240 - 270 of the The World is Flat

**Reading:** pages 124 - 154 of From Global to Metanational

**Reading:** pages 52 - 64 of The Engineer of 2020

**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week

**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Research:** Students continue independent research into a subject of their choice, relevant to the course

### **Week 8**

**Lecture topics:** **Impact of Globalization on Organizations and Multinational Corporations**

**Case Study:** Engineering Education in India

**Reading:** pages 271 - 299 of the The World is Flat

**Reading:** pages 155 - 184 of From Global to Metanational

**Reading:** pages 65 - 76 of The Engineer of 2020

**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week

**Writing:** Each student writes a 3 page essay on a topic assigned by the instructor

**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Research:** Students continue independent research into a subject of their choice, relevant to the course



**Week 9**

**Lecture topics:** **Global Engineering Leadership in Companies Large and Small**  
**Guest Instructor:** Emily Liggett  
CEO, NovaTorque  
Sunnyvale, California

**Reading:** pages 300 - 359 of the The World is Flat  
**Reading:** pages 185 - 225 of From Global to Metanational  
**Reading:** finish the book, The Engineer of 2020  
**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week

**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Research:** Students continue independent research into a subject of their choice, relevant to the course

**Week 10**

**Lecture topic:** **Globalization and Intellectual Property**  
**Guest Instructor:** Gene Spafford  
Professor of Computer Science  
Executive Director, Center for Education and Research in Information Assurance and Security  
Purdue University

**Reading:** pages 360 - 390 of the The World is Flat  
**Writing:** Each student writes a 3 page essay on a topic assigned by the instructor  
**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week

**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Research:** Students continue independent research into a subject of their choice, relevant to the course

**Week 11**

**Lecture topics:** **Engineering and Engineering Education in the Asia Pacific Region**  
**Guest Instructor:** Shyamal Majumdar  
Director General and CEO  
Columbo Plan Staff College for Technical Education  
Manila, Philippines

**Reading:** pages 391 - 420 of the The World is Flat  
**Reading:** complete the book, From Global to Metanational  
**Writing:** Selected students are assigned to write 2 page summaries of online discussions held the previous week

**Discussion:** Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.

**Research:** Students continue independent research into a subject of their choice, relevant to the course



**Week 12**

Lecture topics:	<b>Globalization of Technology Transfer and the Problem of Technology Leak</b>
Case Study:	Globalization at Kimberly-Clark
Reading:	Complete the book, The World is Flat
Writing:	Each student writes a 3 page essay on a topic assigned by the instructor
Discussion:	Discussion topics are assigned by the instructor. Discussion occurs throughout the week within assigned groups of five students each.
Research:	Students continue independent research into a subject of their choice, relevant to the course

**Week 13**

Lecture Topics:	<b>The Future of Globalization</b>
Writing:	Selected students are assigned to write 2 page summaries of online discussions held the previous week
Discussion:	Students propose discussion topics based on reading and lectures, and discuss them in assigned groups during 3 discussion sessions throughout the week.
Research:	Students complete their independent research project

**Week 14**

	<b>30 minute Student Presentations on Their Research Topics</b>
Writing:	Each student writes a 3 page essay on a topic assigned by the instructor
Writing:	Selected students are assigned to write 2 page summaries of online discussions held the previous week

**Week 15****30 minute Student Presentations on Their Research Topics**

Students will receive a grade as well as feedback from the instructor on each writing assignment. Students will receive weekly comments (either oral or in writing) from the instructor regarding issues raised during the discussion sessions.

**F. Reading List (course text)**

The World is Flat by Thomas Friedman; Published by Picador / Farrar, Straus and Giroux (New York, 2007)

From Global to Metanational by Yves Doz, Jose Santos, and Peter Williamson; Published by the Harvard Business School Press (Boston, 2001)

The Engineer of 2020 - Visions of Engineering in the New Century; by The National Academy of Engineering; Published by the National Academic Press (Washington DC, 2004)

**G. Library Resources**

Students are expected to do significant literature research using the world wide web. Students have access to the Purdue online library. Some resources are placed on the Blackboard Vista webpage for the course. The student is expected to locate other needed online resources on their own.

