

CEE 4803F: Global Engineering Leadership

Wednesdays, 3-6 pm, Howey 204S

Instructors

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Course Description

A foundational course in the Global Engineering Leadership minor, the objective of this course is to introduce students to a wide range of skills necessary to succeed as a global engineer-leader. The course is structured around two semester-long team projects: how to start a domestic engineering firm and how to evaluate whether to take that firm global. Lectures and assignments on the global grand challenges, strategic planning, engineering ethics, intellectual property, and communicating across cultures complement the central team projects and provide students with the skills necessary to successfully complete their work. Finally, because excellent written and oral communication skills are a hallmark of the global engineer-leader, this course is communication-intensive, requiring students to write and speak many times throughout the semester.

Course Objectives

After completing successful work in the course, students will be able to do the following:

- Identify the career steps in an engineering firm and understand the scope of responsibilities in becoming an engineering firm leader
- Understand the market sector, financial, and human resource factors that go into creating an engineering firm
- Evaluate the global viability of an engineering firm in terms of international markets and the current geo-political climate
- Understand the components of a strategic plan
- Demonstrate advanced written and oral communication skills

- Demonstrate an understanding of cross-cultural communication issues
- Demonstrate skills in collaboration and team-building
- Demonstrate a knowledge of engineering ethics

Projects

There are two team-based projects in this course. The first is a mid-term oral presentation in which teams will create a fictional domestic engineering firm and present a viable business plan, complete with market sector analysis and associated financials. The second is a final oral presentation and written report in which the same teams will evaluate whether, based on factors such as international markets and current political climates, it would be a sound decision to take that engineering firm global. (See pages 7-8 for full descriptions.)

Team Building

Each engineering team will be required to attend an hour-long team-building workshop with Dr. Wes Wynens. The objective of the workshop is to teach each team about the basic principles of collaboration, the obstacles to effective collaboration, the attributes of an effective team, and then to offer them strategies for working together effectively. These workshops will take place early in the semester--shortly after the teams are formed—in order that teams may derive the most benefit as they proceed through the semester.

Written Assignments

Although the course is structured around the mid-term and final projects, there will be three written assignments that are designed to further students' understanding of global engineering leadership issues and demonstrate their competency in addressing them.

Assignments:

1. Of the grand challenges identified by the National Academy of Engineering, pick the challenge that either is most relevant to your career or you are most passionate about. Write an essay in which you discuss the technical, political, social, and/or economic issues associated with the challenge and describe how different countries around the world are addressing it. Your discussion must reflect the lectures you have heard, the readings you have been assigned, and any research you have conducted on your own. Your audience is educated, non-engineers; therefore, incorporate strategies for communicating with a nontechnical audience. (Length: 4-5 pages, double-spaced, 11-pt font, ASCE documentation style)
2. Read the strategic plan of either an educational institution (or a school or department within that institution) or a company that you have worked for as an employee, co-op, or intern. (Other options exist—we will discuss these in class.) Analyze and evaluate the plan based on the readings you have been assigned, the criteria presented to you in class, and any research you have conducted on your own. (Length: 3-4 pages, double-spaced, 11-pt font, ASCE documentation style)

3. Based on reading *The Culture Map*, listening to the cross-cultural communication lecture, and participating in in-class activities, choose one of the following assignments:

A. Describe an experience you have had working or studying in another culture. Explain the challenges you faced and the strategies you used—or didn't use—to meet those challenges.

B. Identify a foreign country that interests you and, based on your knowledge of and research on that country, identify challenges that you might encounter while working there. What will you do to help yourself become more adept at working in that culture?

NOTE: Whichever option you choose, your essay must reflect your knowledge of *The Culture Map*. It will do so by incorporating terminology, concepts, and strategies presented in the book. (Length: 2-3 pages, double-spaced, 11-pt font, ASCE documentation style)

Required Textbook

Erin Meyer, *The Culture Map*

Required Readings

Students will be assigned required readings for all modules of the course. These readings will supplement the material presented in the lectures and contribute to students' ability to successfully complete the written homework assignments and the term projects. See page 6 for the list of required readings and the reading schedule. All readings will be either posted on T-Square or electronically accessible.

Grading

The final grade will be determined from the following grading scheme:

- Grand Challenges Essay—20%
- Strategic Planning Analysis—15%
- Mid-term Presentation—20%
- Workshop Presentation on Ethics—5%
- Intercultural Communication Assignment—10%
- Final Report and Presentation—30% (15% each)

Website

The website for this course is <https://t-square.gatech.edu>. Students are expected to check the site regularly for announcements and are responsible for all material posted. Emails to the class will be sent via T-Square to the email on record. It is the student's responsibility to check email regularly.

Prerequisites

Junior or senior standing and by permission of the instructors

Course Conduct

The Georgia Tech Honor Code is the standard of conduct for this course. The Honor Code is available at <http://www.honor.gatech.edu/>.

Office of Disability Services

The Georgia Institute of Technology has policies regarding disability accommodation, and these policies are administered through The Office of Disability Services. Students with disabilities should contact this office if they need to request classroom accommodations.

<http://disabilityservices.gatech.edu/>

CEE 4803F: Global Engineering Leadership

Fall 2016 Schedule

(may be modified by the instructors)

Date	Instructor/Speaker and Topic	Assignment Due
Aug 24	Bonaparte: Understanding the CEE Business Sector, Building a Career, and Becoming a Leader in the Sector	
Aug 31	Bonaparte: Building a Successful CEE Firm	
Sept 7	DesRoches: Grand Challenges; Rosenstein: Nontechnical Communication	
Sept 14	Brown and Lieuwen: Grand Challenges Lectures	
Sept 21	Clough: Strategic Planning	Grand Challenges essay
Sept 28	Rosenstein: Presentation Workshop	
Oct 5	Clough: The Global Engineer-Leader	Strategic plan analysis
Oct 12	Team Presentations: Business Plan for a Domestic Company	Mid-term presentations: Groups 1-3
Oct 19	Team Presentations: Business Plan for a Domestic Company	Mid-term presentations: Groups 4-6
Oct 26	Bonaparte: Taking an Engineering Firm Global	
Nov 2	Bonaparte: Engineering Ethics	Workshop presentations
Nov 9	Wynens: Cross-cultural Communication	
Nov 16	Blythe: Intellectual Property; Geosyntec engineers: CEE Intellectual Property Experiences	Cross-cultural assignment
Nov 30	Team Presentations: International Expansion Evaluation	Final presentations/Report

Required Lecture: November 28th (Monday) at 2pm. General Breedlove, former Supreme Allied Commander, NATO Europe. This lecture will be recorded for those who cannot attend.

Reading Schedule

Reading

Due Date

Grand Challenges

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| 1. "Grand Challenges for Engineering," NAE Press | Sept 7 |
| 2. "Improving How Scientists Communicate About Climate Change" | Sept 7 |
| 3. Climate Change 2014, Synthesis Report | Sept 14 |
| 4. "Confessions of a Wasteful Scientist" | Sept 14 |
| 5. "Closer Look," WABE, August 4, 2016, Juno Spacecraft | Sept 14 |

Strategic Planning

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| 1. "The McKinsey 7-S Framework" | Sept 21 |
| 2. "5 Steps to Improve Your Team's Strategic Planning" | Sept 21 |
| 3. "Scenario Planning: A Tool for Strategic Thinking" | Sept 21 |
| 4. Strategic Plan Criteria | Sept 21 |

Engineering Ethics

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| 1. ASCE Code of Ethics | Nov 2 |
| 2. Engineering Ethics Case Study | Nov 2 |

Cross-Cultural Communication

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| 3. The Culture Map * | Nov 9 |
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(* Begin reading this the first week of classes)

CEE 4803F: Global Engineering Leadership

Term Project: Developing a Domestic Business Plan for an Engineering Company and Evaluating the Possibility of International Expansion

Term Project Overview

This semester-long project will have two parts: in the first part your team will develop and present a business plan for starting an engineering company in the United States. Your team will present this plan in the middle of the semester. In the second part of the project, you your team will evaluate whether or not it is a good idea to expand the company internationally to a country chosen by your team and approved by the instructors. Your team will present this evaluation at the end of the semester. You will receive specific instructions regarding time limits and other presentation issues as we get closer to the presentation dates.

Through this project you will first gain experience in thinking about starting a business in a strong and well-developed economy, in a country that is safe, has strong labor laws and can provide a workforce that you can communicate well with, and whose culture you understand. You will then get experience thinking about expanding that business to a possibly emerging or less-developed country, whose economy is perhaps less stable, and whose laws, customs, language and business culture are unfamiliar to you.

Project 1: Domestic Business Plan

Required Content

Although there are many factors to consider when developing any corporate business plan, the factors your team must include in your domestic business plan are listed below. Additional details and insights on each of these topics will be given in the class before you start developing your plan, and a template will be provided to guide you.

1. Description of business
2. Market sector analysis
3. Competitor analysis
4. Value proposition and marketing plan
5. Business development plan
6. Staffing plan, including leadership/management structure
7. Financial profitability plan (simple, steady state, accrual only)
8. Somewhere in the plan address the following questions:
 - “How does your company contribute to solving one or more of the NAE Grand Challenges or other significant global challenges, such as addressing climate change adaptation, creating sustainability, or benefiting underserved communities?”
 - “Do your company’s services contribute to or help reduce CO₂ or GHG?”

Project 2: Evaluating the Possibility of International Expansion

Required Content

Although there are many factors to consider when evaluating whether or not to take a company global, the factors your team must include in your evaluation are listed below. Additional details and insights on each of these topics will be given in the class before you start developing your evaluation, and a template will be provided to guide you.

1. Describe the basic attributes of the country and city targeted for expansion and explain why you chose that country and that city
2. Identify native and US engineering firms operating in your expansion country and evaluate the attributes of those that are potential, significant competitors
3. Identify 4-5 potential native and U.S. clients that would be the focus of your business development efforts; explain the value proposition you will present to these clients
4. Develop a staffing plan for your start-up operation
5. Evaluate business case-critical questions
6. Evaluate currency fluctuation risks
7. Evaluate personnel case-critical questions
8. Evaluate political, social and cultural factors
9. Make and justify your Go/No-Go recommendation to the Board of Directors