Engineering in a Global and Societal Context

May 2012

Professors: Meng, Lin, Vigeant, Buffinton

Course Web Site: http://www.bucknell.edu/x64771.xml

Course Description: Engineering in a Global and Societal Context is a three-week study abroad course, taught in various parts of the world, that studies the global and societal context of engineering including the impact of traditions, customs, and culture on engineering.

The primary theme of the program in 2012 is the dynamic changes in an ancient land. Sites to be visited include those that highlight the millennia of engineering accomplishments in China (Great Wall, Forbidden City) as well as those that display the tremendous rate of growth and change in the present day (Port of Shanghai, Olympic Village, Three Georges Dam).

The format of the course involves daily field trips, journaling assignments, student presentations, a culminating term paper, and engaged discussions amongst students, faculty, site-visit hosts, and peoples of the countries we will be visiting. Particularly because of the short duration of the course as well as the intense schedule, preparation for each of our activities is essential, and energetic and thoughtful participation in each day’s activities is a must. Beyond simply the planned schedule of educational components of the course, students are strongly encouraged to be active observers of the people, culture, and languages of the locations we will be visiting.

ABET Outcomes Addressed:

• The broad education necessary to understand the impact of engineering solutions in a global and societal context;
• A recognition of the need for, and an ability to engage in life-long learning;
• Knowledge of contemporary issues.

Learning Objectives:

1. Develop a historic perspective on the development of China from ancient times to the present.
2. Understand the limitations of technology and how today’s engineering solutions can become tomorrow’s societal problems.
3. Understand how traditions, customs, and culture impact engineering projects.
4. Understand how projects in one country can be affected by policies, laws, and customs of other countries.
5. Understand how political, financial, and environmental constraints affect the design and operation of engineering systems and processes.
6. Understand how and why environmental and social policies in China are different from those in the US.
7. Articulate how the approach to environmental conservation differs from the US.
8. Appreciate some of the differences between Chinese and US higher education.
9. Describe some of the risks and opportunities of working abroad.
10. Understand the ramifications of engineering in an emerging economic power.
Attendance: Attendance and thorough preparation for ALL activities listed on our schedule is absolutely essential. Students will only be excused in cases of illness; faculty consent must be obtained. Unexcused absences are unacceptable and will result in a minimum of at least a one letter reduction in final grade. **On-time arrival at all scheduled events and departures is also essential.** Lateness will be penalized with a one-third letter reduction in final grade, at a minimum. Particularly in this course, arriving on time is a requirement and courtesy that you owe your fellow students, professors, and hosts. Arriving late not only diminishes your own experiences, it also diminishes the experiences of each of your fellow participants.

Safety: The large cities were we will be traveling are not Lewisburg or New York. You will need to conform to several safety rules at all times, not only to protect yourself, but also to avoid creating a risk for the entire group. These rules will be enforced with a minimum of a one-third letter reduction in final grade and a maximum of being **sent back to the US immediately** at your own expense and fail the course.

- You will have a “buddy” and remain with them at all times during the trip
- You will be alert to your surroundings and will not take actions that compromise your ability to be so (i.e. getting drunk)
- You will avoid behaviors and accessories that call attention to yourself and target you for theft
- You will stay out of any area designated as inappropriate by faculty / guides
- You will conform to curfews when applicable
- You will obey local laws and Bucknell rules

Professionalism: In the not too distant future, you will become a full-time working professional. We as faculty members will treat each of you as a professional person and correspondingly expect you to behave professionally in all aspects of this course. A large portion (i.e., 25%) of your final grade will depend on the degree of professionalism and participation you exhibit in planned activities and throughout the duration of the course. As you may already know, professional people behave in the following ways:

(a) Professionals arrive on time.
(b) Professionals arrive fully prepared to contribute meaningfully to discussions, to answer questions posed to them by colleagues and supervisors, and to ask questions about what they observe or do not understand.
(c) Professionals listen carefully to others and treat them with civility and tolerance (even when they do not agree with others’ points of view). This is particularly important in regards to the people you will meet both directly connected to ENGR 290 and those you will encounter in other situations such as hotels, restaurants, and public transportation.
(d) Professionals are honest.
(e) Professionals accept responsibility for their actions and failures to act.
(f) Professionals respect the property of others
(g) Professionals are resourceful; that is, they take the initiative in gathering information they need and in gaining as much benefit as possible from every situation.
(h) Most importantly, professionals constantly strive to give their very best at all times and to grow in their capacities to learn and to contribute positively to the experiences of those around them.
Grading Procedure: Your final grade in this course will be based on your performance with respect to the following:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Professionalism and Active Participation</td>
<td>25%</td>
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<tr>
<td>Presentations</td>
<td>35%</td>
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<tr>
<td>Journals</td>
<td>20%</td>
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<tr>
<td>Term Paper</td>
<td>20%</td>
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Schedule: The schedule is attached but has yet to be finalized. Although every effort will be made to make this schedule as definite as possible, please note that unanticipated changes may occur. The faculty will announce changes as far in advance as possible. Please do not hesitate to speak with us if you have any questions.

Keys to Success in ENGR 290: Finally, we would like to give you some further small bits of advice on how to make your experience in this course as rewarding and enjoyable as possible. For our part, we promise to do our very best to facilitate your opportunities to learn throughout ENGR 290. In turn, we expect you to fully engage in all activities that we have planned for you. Prepare early, be on time, take every opportunity to interact with the people and places we will be visiting, and reflect thoughtfully on your experiences in your journal and term paper. We expect that the experiences you have in this course will stay with you your entire life. They will help prepare you to work in a global environment; they will make you more aware of the variety of ways that different cultures and countries approach engineering problems and their solutions. In short, the experiences of this course will not only help you during your remaining semesters at Bucknell but also in the many years that will follow in your future careers. We thus urge you to make a concerted effort to get as much out of this course as possible. We hope that you not only learn a lot during our three weeks together but that you also have fun in the process!

Presentations: You and a partner will be responsible for two presentations during this trip. The target length of each is ~15 minutes.

Pre-Visit Presentation (20%): Each team will be assigned one trip location (example: the Great Wall of China) and prepare a 15 minute, non-Powerpoint presentation on it. The goal of this presentation is to convey the history, engineering relevance, and cultural relevance of a site. Each presentation must end with 2-3 discussion questions for the group to keep in mind as we visit the site, and then discuss thereafter. Full assignment details will be available in April to give you time to prepare.

Summary Presentation (15%): Towards the end of our trip in China, each team will give a 15 minute presentation on what they have learned with particular reference to their site and/or ideas raised in their journal entries.

Journals: Journals are a tool to increase your self-awareness, your perceptive examination, and your memory retention of your study-abroad experience. Journals are an old practice. Authors, artists, poets, political leaders, scientists, and ordinary people in all walks of life have kept journals. Some, such as those of Leonardo Da Vinci and Charles Darwin, have become key documents for understanding the minds of their authors. A journal is a proven way to induce yourself to observe closely, to think about what you are encountering, to draw insightful
conclusions, and to remember in detail what you have experienced. If you don’t keep a journal you will generally not rise above the level of a tourist, gathering vignettes and impressions filtered through the distortions of your home culture.

Effort: Keeping a journal is not easy, and is not necessarily fun. A journal requires time that you would probably prefer to spend doing something else, or doing nothing. But the discipline of keeping a journal, of making time for it every day regardless of how busy the day is, puts this tool to use and keeps your perceptive powers sharp.

Audience: Your first intended reader is yourself. This is a tool for your own exploration. If you write it simply to satisfy your professors, you are turning a highly beneficial tool into simply another burden. Your second intended readers are your professors.

Detailed Requirements for Journals:
Frequency: Six entries weekly, one each for Monday through Friday and one for the weekend.
Format: Daily entries should average about 2 sides of a page of a journal notebook, although many will be longer, and some will be shorter.
Content: What you put in your journal is a conversation with yourself. It is notes about what you see, what you have encountered, and what you think it may mean. It should include small experiences as well as large ones. It should include not only items that are directly tied to the course, but also items that may be tangential. It should include many experiences outside what is discussed in the course: if you visit a restaurant, see an episode on the street, walk in a park, are puzzled by the wording of a sign, see something you wouldn't expect to see in your U.S. life, your journal is where you take note of it. A journal is not a diary. While, like a diary, it may contain comments about your personal feelings, mostly your journal will be focused on your process of encountering and coming to understand Brazilian society and the role of the natural world driving the engineered world. It trains you to be observant. It records what you observed and what you think it means.

Submittal and Review: Journals will be collected and reviewed by your instructors as shown on the itinerary. Suggestions for improvement will be made as needed. Journals will be submitted along with the final term paper before the end of summer school and assessed as part of the faculty’s assessment of the student’s work for the course.

Term Paper: In preparing the culminating term paper required for completion of ENGR 290, we ask you to divide your paper into three sections with the following headings: Broad Experiences, Learning Objectives, and Impact on Future and Professional Career.

Broad Experiences:
Under this heading, you should address the broad factors that influence “the global and societal context of engineering” as well as the “the impact of traditions, customs, and culture on engineering.” This section of the paper should be organized with the following subheadings under which you should write about your experiences in the course related to:

• Globalization (the integration of economic, technological, socio-cultural, and political systems across the world);
• Contrasts between Brazilian and U.S. approaches to energy production, conservation, and policy and more broadly to industry and business;
• Sustainability (the meeting of societal needs through means that do not deplete nonrenewable resources);
• Cultural and Lifestyle Differences that you directly observed and experienced in interacting with people (presenters, students, others) while in Brasil;
• Perceptions of the U.S. (the government, the people, and our specific travel group) that you encountered and observed.

Your comments and observations should be supported by the details you recorded in your journal about each of our activities. The responses written to “questions of the day” may be particularly helpful in this regard.

**Learning Objectives:**
This section of the paper should have a subsection for each learning objective of the course. For each learning objective you should identify and describe an experience (or collection of experiences) and examine how the experience(s) related to the objective. For those learning objectives not, or only partially, met, you should describe additional experiences that could realistically be incorporated into the course that would facilitate the meeting of the objective. The learning objectives are listed above.

Within the context of our course, note that the word “projects” in the above objectives also includes “systems” and “processes.”

**Impact on Future and Professional Career:**
Finally, and equally importantly, you should describe in this final section how the course is likely to impact your future and your professional career. Comment on:
• How the program has been of benefit to you and your education;
• What you will specifically take away from the course that you believe will be of value to you in the future;
• How the course has contributed to the development of the broad education necessary to understand the impact of engineering solutions in a global and societal context;
• Specific strengths of the course (as a whole and in terms of individual activities);
• Overall changes that you would propose to improve the effectiveness of the course.

The term paper must be a minimum of 4,500 words (give your actual word count on the title page). Your paper should be e-mailed to Prof. Raymond no later than July 5, 2010. Journals should be mailed to Prof. Raymond by the same date. Journals will be returned at the beginning of classes in the fall.

The journals and papers will be distributed equally among all three professors for grading. The professors will then meet, review the grades, and decide on a final grade for each student in the course.
## ENGR 290: China 2012
### Proposed Program Itinerary Brief (Tentative)

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<th>Sunday</th>
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<td>Arrive in Shanghai</td>
<td>Culture and History in Shanghai</td>
<td>Company Visits in Shanghai</td>
<td>Trade Port Visit in Shanghai</td>
<td>Travel to Nanjing Company Visit in Nanjing</td>
<td>Culture and History in Nanjing</td>
<td>Travel to Beijing</td>
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<td>Day 9</td>
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<td>Culture and History in Beijing Peking Duck Dinner</td>
<td>Culture and History in and around Beijing (Great Wall)</td>
<td>Business and University Visit in Beijing</td>
<td>Travel to Xian Shaanxi Dinner</td>
<td>Culture and History in Xian (Terracotta Warriors)</td>
<td>Culture and History in Xian</td>
<td>Travel to Chengdu Sichuan Dinner</td>
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<td>University and Culture Visit in Chengdu (Pandas)</td>
<td>Travel to Yichang through Chongqing</td>
<td>Three-Gorge’s Dam Visit</td>
<td>Travel to Shanghai</td>
<td>Company Visits in Shanghai</td>
<td>Water Town Visit Farewell Dinner</td>
<td>Depart China</td>
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