Twelve Years of Short-Term Study Abroad Programs: Engineering in a Global and Societal Context

Dr. Donna M. Ebenstein, Bucknell University

Donna M. Ebenstein is an Associate Professor of Biomedical Engineering at Bucknell University. She is also the chair of Bucknell University's Committee on Off-Campus Study and Engineering International Education Committee.

Dr. Margot A. Vigeant, Bucknell University

Margot Vigeant is the Robert L. Rooke Professor of chemical engineering. She earned her B.S. in chemical engineering from Cornell University, and her M.S. and Ph.D., also in chemical engineering, from the University of Virginia. Her primary research focus is on engineering pedagogy at the undergraduate level. She is particularly interested in active, collaborative, and problem-based learning, and how these can be applied to improve conceptual learning. She is also interested in the ways hands-on activities and technology in general and games in particular can be used to improve student engagement.

Dr. Jeffrey C. Evans P.E., Bucknell University

Jeffrey C. Evans, Ph.D., P.E., F. ASCE is Professor of Civil and Environmental Engineering and Chair, Department of Mechanical Engineering at Bucknell University in Lewisburg, PA.

Twelve Years of Short-Term Study Abroad Programs: Engineering in a Global and Societal Context

Abstract

A three-week study abroad program for engineering students at Bucknell University has been offered thirteen times from May 2004 to May 2016. The intent of the program is to provide an alternative for students who cannot spend a semester or year abroad, enabling more engineering students to gain international experience before they graduate. Students receive one course credit (4 credit hours) for the program, which counts as a free elective or an engineering elective, depending on department. The program was delivered in: the United Kingdom in 2004, 2006 and 2011; Argentina in 2007 and 2013; Switzerland, Germany and France in 2008; Norway and Sweden in 2009; Brazil in 2010; China in 2012; Costa Rica in 2013; New Zealand in 2014; Italy in 2015; and Chile in 2016. Over 280 students and seventeen different faculty members have participated.

This study abroad program was initially designed to address ABET General Criterion 3(h) which notes that graduates must have "the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context." Specific ABET educational outcomes for the program include: 1) the broad education necessary to understand the impact of engineering solutions in a global and societal context, 2) recognition of the need for, and an ability to engage in, life-long learning, and 3) knowledge of contemporary issues. These outcomes have been mapped to ten learning objectives common to all offerings of the course, which are included in the paper.

To meet these educational outcomes, the programs are planned around multifaceted themes accessible to all engineering majors, including: Transportation (UK); Water Resources (Argentina); Engineering in Ancient Lands (Italy, China); Engineering in Extreme Environments (Chile); and Energy and Sustainability (Switzerland/ Germany/France, Norway/Sweden, Brazil, Costa Rica, and New Zealand). Courses typically consist of a series of lectures, site visits and guest speakers arranged around the underlying technical theme. The paper provides examples of course activities from some of these programs.

Student requirements include daily class and field trip attendance, a daily journal, and a term paper written and submitted after the students return to the United States. Faculty assess student achievement directly through the end-of-course term papers that require students to make explicit connections between course activities (presentations and site visits) and the learning objectives. Self-assessment data have also been gathered for all programs. Both the direct assessment and self-assessment data demonstrate a high level of outcome achievement that has remained consistent throughout all offerings of this course.

Introduction

The need for, and benefits of, international education experience for engineering students is well established.[1,2] Since 2004 Bucknell University has offered an intensive, immersive 3-week international program, ENGR 290: *Engineering in a Global and Societal Context*,[4] for undergraduate engineering students. As opposed to many short-term study abroad courses that

return to the same sites on a regular basis, ENGR 290 addresses a consistent set of course outcomes in a manner that may be adapted to a variety of course themes and locales. The program has been delivered as shown in Table 1.

Table 1: ENGR 290 course locations, subtitles/themes.

Year	**Location(s)**	**Subtitle/Theme**
2004	United Kingdom	Transportation & Environment
2006	United Kingdom	Transportation & Environment
2007	Argentina	Water Resources
2008	Switzerland, Germany & France	Energy Production, Utilization & Policy
2009	Norway & Sweden	Energy & Sustainability
2010	Brazil	The Natural World Driving the Created World
2011	China	Dynamic Changes in an Ancient Land
2012	United Kingdom	Transportation & Environment
2013*	Argentina	Engineering in a Developing Economy
2013*	Costa Rica	Energy & Sustainability
2014	New Zealand	Energy & the Natural World
2015	Italy	Engineering in the Cradle of Change
2016	Chile	Engineering in Extreme Environments
2017	Iceland	Alternative Energy & Sustainability

* Two programs were offered in 2013.

Each year, the programs are led by two or three engineering faculty members who develop and carry out the program activities with the assistance of guest speakers from the host countries. Student enrollments have varied from 14 to 33 and the programs are self-funded through tuition and program fees. Over 280 students and seventeen different faculty members have participated in this course.

The origins of the course go back to 2002 when two civil engineering faculty members collaborated to enhance global literacy for engineering students. Study abroad participation for engineering students, as a group, is typically low when compared to students from other majors. Reasons are many but the linear nature of engineering curricula often deters engineering students from pursuing study abroad experiences. While many would consider a longer duration student abroad experience best, it has been shown that intensive short-term, faculty-led study abroad programs can positively impact the development of cross-cultural sensitivity.[3] With the goal of increasing study abroad participation among engineering undergraduate students, a course that would be both intensive and short-term was developed and named *Engineering in a Global and Societal Context*. Course goals and learning objectives that could readily be adapted or modified, depending upon the destination country, were developed. Since the founding faculty members were experienced in teaching and research in the United Kingdom (UK), this was chosen as the location of the first offering of the new short-term study abroad course. The instructors mined established contacts to arrange for guest speakers and field trips. In subsequent versions of the course, host countries were chosen, in part, because faculty members had prior experience or knowledge of the host country upon which to build a thematic curriculum. Also, to ensure the sustainability of the course and to assist new faculty in their development of these programs, the

college of engineering organized summer institutes in the summers of 2007 and 2011 co-taught by the course founders and other experienced course leaders.

This paper describes the goals and learning objectives of the course, the activities used to achieve these objectives, as well as the assessment of how well these objectives were achieved over the twelve-year time period. To provide a better understanding of the course, the paper also briefly describes representative versions of the course. Finally, administrative and logistical issues are discussed.

The short-term study abroad program described in this paper has been proven successful in two ways. First, the number of engineering students in our college of engineering graduating with a study abroad experience has increased from an average of less than ten per year to an average of more than fifty per year due, in large part, to the availability of this program and other 3-week summer programs (more than half of engineering abroad experiences each year are 3-week summer programs). Second, student self-assessment of the course demonstrates that this program provides an impactful global education experience that they would have missed out on if only semester long study abroad options were available. The information on this program is offered as a model to other institutions of one way to increase study abroad participation and global education impact that can be emulated or adapted to fit specific institutional goals and constraints.

Engineering in a Global and Societal Context

Engineering in a Global and Societal Context[4] (ENGR 290) is designed to enhance the participating students' awareness of global and societal issues impacting and impacted by engineering decisions. Students earn one course credit (four credit hours) that can count as a free- or engineering-elective. The course is typically scheduled immediately after the end of finals in the spring semester to permit student to return home for the summer with adequate time remaining to have a summer internship. The program provides an opportunity for students who are not able to spend a semester abroad to gain international experience before they graduate.

The ABET Outcomes addressed in this course include: 3h) the broad education necessary to understand the impact of engineering solutions in a global and societal context, 3i) recognition of the need for, and an ability to engage in life-long learning, and 3j) knowledge of contemporary issues. To support these outcomes, ten specific course learning objectives were developed, some of which were country specific. To meet the learning objectives, a series of lectures, site visits and guest speakers were arranged using underlying technical themes appropriate to the host country and accessible to all engineering majors (e.g., transportation, sustainability, water resources). Evaluation of the students was based on class and field trip attendance and active participation, a daily journal, and a term paper written and submitted after the students returned to the United States.

Course learning objectives are adapted each time the course is offered to allow for learning opportunities unique to the host country and chosen theme, while maintaining consistency of the course from year-to-year. The learning goals generally used for each of the offerings over the period under study are:

1. Develop a historic perspective on the development of [COUNTRY] from [appropriate historical period] 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 language, traditions, customs, and culture impact engineering projects and products.
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 [country] 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 [COUNTRY] and US higher education.
9. Describe some of the risks and opportunities of working abroad.
10. Understand the ramifications of engineering in [COUNTRY].

An example of the tailoring of these generic learning objectives for students taking the course during 2011 in China is provided below. Students completing this course in China were expected, upon completion of the course, to be able to:

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.

Instructional Methods

To achieve the educational outcomes, a series of lectures, site visits and guest speakers are arranged using the identified country specific issues as the underlying themes. For example, the 2011 version of the course planned the activities in China so that students would have first-hand experiences associated with the learning goals mentioned above. These activities included engineering site visits, presentations and discussions led by the hosts, students' reflections in group discussions and students' individual journaling. The class visited four types of sites:

1. Engineering sites such as 2008 Beijing Olympic stadium (Bird's Nest), the Great Wall and Three Gorges Dam;
2. Cultural sites with engineering significance including the Terra Cotta Warriors, the Forbidden City and Tiananmen Square;

3. Businesses sites including DuPont, GE, HP, AECOM, IBM, Lenovo, Air Products & Chemicals, and Shanghai Xin Tai Printing Company; and
4. University sites including Southeast University in Nanjing and the University of Electronic Science and Technology of China in Chengdu.

When visiting a company, students often attended a presentation and a Q&A session led by the host to discuss what the business does, how the business works in a global environment, and what impact the business has on China and on the global market. When visiting universities, ENGR 290 students met with students at the host institution, attended research lectures, toured campus, and spent time in spaces like the cafeteria or library to learn more about student life. Students reflected on what they saw during the visit in an evening session with the entire group, and wrote their thoughts in their personal daily journals. Instructors incorporated these activities into the course syllabus to maximize the effectiveness of learning when visiting the sites in China by encouraging the students to reflect on their experiences throughout the trip.

As another example, in the UK (2004, 2006, 2012) the technical focus was transportation and the environment. Students were in London for the first and third weeks, and during the second week the group traveled to York, Nottingham, Oxford or Cambridge and Bath. While in London, the students were generally in the classroom in the morning and in the field in the afternoon. Bucknell University faculty conducted the classroom activities to provide context and background for guest speakers and field trips.

As a third example, for the 2013 version of the course in Costa Rica the students were informed: "The course focuses on learning through experience – we will take daily field trips to sustainable energy facilities, eco-tourism sites, and cultural landmarks. However discussion and reflection of what we experience is equally important. Thus, the course also includes journaling assignments, student presentations, engaged discussions amongst students, faculty, site-visit hosts, our local guides, and the local population. Due to the short duration of the course and its intense schedule, preparation for each activity is essential, as well as energetic and thoughtful participation in everything we do. This is not a time to sit back and zone out, students are strongly encouraged to be active observers of the people, places, and culture we experience in Costa Rica."

Evaluation of Students

Given the immersive nature of this three-week program, conventional means of student evaluation though examinations were thought to be inappropriate. Instead, student evaluation is typically based on three major components: 1) participation in all activities and discussions, 2) reflective writing in a journal, and 3) a “term” paper written after the students returned to the US. For some offerings of the course, students have also been asked to research and present to the group on the cultural and engineering significance of locations the students were going to visit in the following days. The importance of attendance in a venue-specific program of this type is self-explanatory. The journal, a recording of factual information coupled with synthesis and interpretation in the context of the host country and American practices, was a major daily component of the students’ activities. Finally, within five weeks of the completion of the abroad experience the students were required to submit a 4,500-word minimum “term” paper. This paper provides the best evidence of how well students met the learning objectives of the course. Specifically, the paper prompt included the specification that for each of the program’s learning objectives the students had to

identify and describe an experience (or collection of experiences) and explain how the experience(s) led them to accomplish the objective. For those learning objectives not met, the students had to describe how their experiences fell short of enabling a meeting of the objective. In addition, students had to describe how the course is likely to impact their future and their professional careers.

Consideration was given to the use of quizzes on reading assignments, speakers and field trips, but it was decided that these were unnecessary. In hindsight, this appears to be a correct decision as the majority of our students have been fully engaged in the program without adding traditional quizzes to this non-traditional course.

Assessment of Program

The overarching goal of this program is to increase the cultural competence of engineering students through an abroad experience. Based on lessons learned from the American University Center of Provence (AUCP), the eight fundamental elements of an abroad program that were found to have the most impact on student intercultural learning are:[6]

1. Clarity of purpose
2. Clarity of learning goals
3. Cultural immersion
4. Holistic design
5. Challenge and support
6. Reflection and analysis
7. Student accountability
8. Assessment

Our three-week program, as it is currently run, addresses all of these elements. The purpose of the program (element #1) is clearly stated in the official name of the course, Engineering in a Global and Societal Context. The ten learning objectives (element #2), as defined above, focus on concrete skills to be learned rather than vague terms like intercultural competence. In addition, the learning goals are listed in the syllabus and directly addressed by students in the final report. Even as the theme and location of the course changes, both the course title and the learning objectives remain constant and clearly articulated.

Due to the short-term nature of this program, the target level of cultural immersion (element #3) varies from exposure to contact. Although students stay in hotels or hostels rather than more immersive homestays, the course instructors design the course and schedule activities to ensure exposure to the local culture through a variety of methods. Courses typically include a minimum of at least one cultural dinner (typically several), a scheduled interaction with local students, and significant amounts of time on public transportation and walking in urban areas. Often there is also some level of language instruction, although this varies from offering to offering. There is also often opportunities to interact with the local population through attendance at sporting events such as soccer games. All these activities are required for all students, and the students are expected to reflect upon each activity as part of their coursework. In addition, most programs provide the students with some free time to explore local communities. To augment this limited cultural immersion time, there are several pre-departure meetings that focus on different elements

of local culture, and in recent years there has also been a focus on local language skill development prior to and during the trip.

While the short-term nature of the program may limit opportunities for increased cultural immersion, as is achieved through home-stays, it does make it easier to provide a holistic design (element #4) that includes sufficient challenge and support (element #5). The entire three-week program is designed and implemented by a small group of faculty who travel with the students to all locations. To provide sufficient challenge and push students out of their comfort zones, there are periods of free time built into each program where students are encouraged to foray out on their own to interact with locals and, at minimum, navigate ordering a meal in a local restaurant. To support students in meeting these challenges, faculty engage students in discussion of local culture and expectations both before trip departure and while abroad, and are available to mediate any issues that may arise during the trip. The constant presence of both faculty and students from the host institution provides a level of comfort and security to the students that they might not have on a full-semester independent study abroad program.

The expectations of student engagement and mechanisms of student assessment implemented in the ENGR 290 program provide extensive opportunities for reflection and analysis (element #6) while encouraging student accountability (element #7). As outlined above, students are graded based on participation in activities, reflective journal writing that includes both facts and contextualization, and a final term paper where they are required to explain how their experiences helped them to meet each course objective. Faculty provide feedback on individual journal entries throughout the trip to push the students into more reflective journaling, and also lead group discussions to help the students analyze their experiences and interpret them within the context of the host country and American practices. To provide additional student accountability, many course instructors also require each student to research a different site that they will visit during the program prior to departure and give presentations to the rest of the class just before the group visits the site.

The final term paper provides both an emphasis on student accountability (element #7) and a useful assessment tool for the course (element #8). For the final paper, for each of the 10 learning objectives of the course, students are challenged to identify and describe an experience (or collection of experiences) and explain how the experience(s) led them to accomplish the objective. In this way, students recognize their own role in meeting course objectives, while also providing valuable feedback to the course instructors on the effectiveness of the course in achieving each objective. While a pre- and post-program assessment tool might allow more quantitative assessment of gains in each area and may be developed in the future, this qualitative assessment has proven to be valuable in course assessment.

Assessment of Student Learning

Unfortunately, no standardized learning assessment tools were adopted at the start of the program as there was no original intent to conduct long-term studies of the impact of this study abroad course. Thus a number of assessment tools have been utilized over the years, as will be discussed below. The most consistent assessment data we have is the grades on the final term paper. Although the exact prompt has varied over the years, a focus of the paper has always been for students to explain how they have met the learning objectives of the course. Hence, grades on this

term paper provide an assessment of not only how well students are meeting the learning objectives, but also how well they can articulate the connections between their experiences on the trip and the objectives.

The grade distributions for the final term paper for nine offereings of the program are shown in Table 1. As you can see from Table 1, the majority of students (94%) earned As or Bs on the final term paper, suggesting that they made moderate to strong progress in meeting the learning objectives of the course. Only a handful of students over the years have failed to meet the objectives.

Table 2: Grade distribution on final term papers in ENGR 290, reflecting how well students articulated the connection between course activities and learning objectives.

Year	A (4.0)	B (3.0)	C (2.0)	D (1.0)	F (0.0)	Average
2004	10	8	0	0	0	3.5
2006	12	5	0	0	0	3.7
2007	17	4	1	0	0	3.7
2008	24	6	1	0	0	3.7
2010	21	2	1	0	0	3.8
2011	24	4	0	0	0	3.8
2012	8	11	1	0	1	3.2
2014	9	13	6	0	0	3.1
2015	15	9	3	1	0	3.4
2016	25	8	0	0	0	3.8
Overall	165	70	13	1	1	3.6

* Includes all currently available data.

In virtually all versions of the course, an assessment of the course by the students was undertaken in one form or another. Some years, the assessment consisted of a student self-assessment rating their achievement in meeting the ten individual course outcomes. In addition, individual activities such as speakers, field trips, tours and the like were assessed by the students as to what extent the activity contributed to their meeting the learning objectives of the course. In other years, only a more standard course evaluation was completed by each student, with limited focus on how well learning objectives were met. Instead, evaluation focused on the value of the course and aspects of the course mechanics, and all questions were scored on a 5-point Likert scale:

- 5 – strongly agree
- 4 - agree
- 3 – neutral
- 2 – disagree
- 1 – strongly disagree

Due to the inconsistent nature of the assessment, not all data are directly comparable. However, a sample of collected course evaluation data (evaluated on the 5-point Likert scale) is shown in Table 3. These data, along with data collected in other years, suggest that students value their experience in this course. In fact, some students have opted to participate in more than one ENGR 290 program.

Table 3: Relevant course evaluations for 2013 program (Argentina)

Evaluation Statement	**Score**
The course achieved the objectives set by the instructors.	4.05
The course challenged me intellectually.	4.05
I would recommend this course to other students interested in this subject.	4.4
For me, the value of this course was high.	4.2

Student comments from course evaluations further support the quantitative data above. As illustrated by these representative comments from student evaluations, students recognize and appreciate the unique learning environment that the course provides as well as the experiences they have while traveling:

"I believe the fact that we were able to learn in the field (aka Italy) made accomplishing the learning goals easiest. Being abroad allowed for me to learn from professors and others in the actual field of study. Therefore it was unlike any other learning experience because i was learning about the leaning tower of Pisa from a man on the team tasked with keeping it at the same lean. " (Student from ENGR 290 Italy, 2015)

"Interacting with a wide range of people from the former Minister of Mines and Energy to students from various universities to waiters and strangers off the streets. The engineering aspects were fascinating, but I will retain what I learned about people-interactions and languages and different cultures for far longer than I will be able to recite the process flow diagram of how sugar is converted into ethanol. In many ways, I think the cultural/economic/political discussions we had and activities we did will be more beneficial to me in my future engineering career than the obviously engineering-related ones." (Student from ENGR 290 Brazil, 2010)

While these data provide an indirect measure of student gains from the course, the authors also recognize that the impact of this program may only be fully realized at some time in the future as students draw from this educational experience while working in their chosen profession. In the future, a survey of course alumni is planned to better assess the long-term impact of ENGR 290 on students.

Sustainability of the Program

There are a number ways to provide engineering students an opportunity to study abroad, and short-term programs such as the one discussed in this paper are an essential part of a variety of options (e.g., full semester, summer internships, service trips) made available to students. Consistent with identified Best Practices[4] for study abroad this program: 1) is part of a suite of opportunities, 2) has a clear set of outcomes, 3) is proactive in student recruiting, 4) rewards the faculty for participating, and 5) involves several faculty. Recognizing the need for long-term commitment to these programs, a summer institute was planned to provide faculty the tools to lead such a program.

Summer Institute for Faculty– Goal, Objectives, and Expected Outcomes

Since civil and environmental engineering faculty directed the first three programs, the need to broaden faculty participation was clear. For the university to continue to offer these opportunities to future students, and to attract students from diverse majors, faculty members from other engineering departments needed to become involved. As a result, a summer institute open to all engineering faculty was planned and conducted during the summer of 2007. The goal of the summer institute was to give engineering faculty the time and direction needed to plan and the confidence needed to execute three-week study-abroad programs. Four objectives were established for the institute:

1. Identify faculty members and venues for offerings of a 3-week pre-summer school study-abroad course, Engineering in a Global and Societal Context,
2. Give participants the information and confidence needed to execute a three-week study-abroad program so that the university could continue to offer this opportunity to our students in future years,
3. Assist faculty interested in teaching the course in 2008 or 2009 to develop detailed plans for their courses, and
4. Assist faculty interested in teaching the course in 2010-2012 to develop basic frameworks for their courses.

The institute was led by the two faculty members who originally developed the course and led the first two offerings. Any engineering faculty member who was interested in offering the 3-week study-abroad program sometime during the next 5 years was eligible to enroll. The six participants included three mechanical engineering and three chemical engineering professors (one full, two associate, and three assistant professors).

Faculty participants were paid a stipend for the institute. During the first week of the institute participants worked together to establish the basic framework for their 3-week study-abroad programs to be offered over the next five years. During the second “week” (which actually

extended part-time over the following 6 to 8 weeks) those faculty members planning to offer a program in future years produced detailed plans for their programs. Activities included presentations by the instructors and the participants to the whole group, brainstorming sessions in smaller groups, whole group and sub-group discussions, and student critiques of program proposals. Topics for presentations and discussions included program outcomes and learning objectives, venue selection, program activities (speakers, field trips, etc.), assessment techniques, budgeting, student recruitment, health and security concerns, travel arrangements, housing, and more. As a result of the workshop, a firm schedule of course offering for three years in the future and a tentative schedule for the following two years was developed. The offerings planned (and ultimately fulfilled) were 2007 Argentina, 2008 Switzerland, Germany and France, 2009 Norway and Sweden, 2010 Brazil, and 2011 China.

Four years later, during the summer of 2011, a second and similar faculty institute was planned and implemented by experienced program leaders. This resulted in faculty plans to deliver the course in 2012 UK, 2013 Argentina, 2014 New Zealand, and 2015 Italy. By providing workshop training for faculty, and pairing experienced faculty with inexperienced faculty (experience with respect to short term study abroad that is), the momentum and continuity of our short-term study abroad program is being maintained.

The summer institutes, as structured, were effective in their main objectives of identifying faculty to carry out future short-term study abroad programs and preparing them to plan and execute the programs. Previous informal attempts to get faculty to commit to doing these programs had not been as successful. The institute was an effective way to transfer knowledge from experienced program leaders to the less experienced future program leaders. Providing funding from the Engineering Dean's Office for the faculty participants was an excellent way to demonstrate the College of Engineering's commitment to continuing the overseas offerings of Engineering in a Global & Societal Context. The funding was also incentive for the faculty participants to devote summer time to planning abroad experiences for students. Concentrating on the development of the programs full time for one week proved to be productive and was sufficient to develop preliminarily program format and content. Having a second "week" of paid time extend over the remainder of the summer also worked well since it gave participants time to think about their plans, gather additional information from web sites and foreign institutions, and attend to their other summer activities. In conclusion, the Engineering in a Global & Societal Context summer institutes have been an effective way to get a group of engineering faculty to commit to offering future 3-week study abroad programs for engineering students by giving them the tools and time to begin the process of developing successful programs.

Administrative and Logistical Issues

Engineering in a Global and Societal Context was designed so to be offered by any faculty member in the University's College of Engineering and in any location. The overall educational outcomes are appropriate for any engineering discipline, and the specific learning objectives can be modified to fit the program's venue and the faculty leading it. In accordance with campus governance, the Engineering Curriculum Committee, the university International Education Committee, and the university Committee on Instruction approved the course. As long as the learning objectives are not changed, the course can be offered annually without reapproval by the above committees. However, proposals for future offerings of the course are typically requested, reviewed, and

approved by the Engineering International Education Committee following the timeline and procedures outlined in Appendix A: Program Administration. As shown in the timeline, recruitment of faculty leaders begins more than two years before the course is to be offered to ensure continuity of the program.

The cost of the program is normally set at, or somewhat above, the tuition cost for one 4 credit-hour course during the regular academic year. The program fee covers tuition, airfare, lodging, transport and all scheduled activities. Students need additional funds for meals and non-program travel. The program is cost-neutral to the university. Higher program fees are generally associated with expensive host countries and/or long distances reflected in higher airfare costs. The typical cost to students for the 3-week program has been approximately $6300 in recent years. This cost can be inhibitory to student recruitment, as there is limited financial aid available at our institution in support of this program and we have lost several well-qualified and interested students who could not afford to pay the full program fee. We are working to increase the budget for student financial aid for study abroad programs, but this is a limitation to consider when developing a new abroad program.

For all overseas programs the university requires that a crisis management plan be in place to cover any major emergencies. Some of the components of the crisis management plan are given below:

1. A photocopy of page one of the passport of each student is kept in the files to facilitate replacement in case of loss.
2. A system of rapid communication with students and staff of the program is devised and tested. This communication network may be used for communicating academic and social notices, but it should also enable the director to contact all students at short notice and assemble the group quickly. A list of student addresses and telephone numbers is maintained.
3. In the event of a crisis, it is the immediate responsibility of the program director to locate all students and to inform the home (US) campus office about their welfare. During a crisis students are instructed not to travel independently and to remain at a location where they can be reached.
4. An orientation for the students is conducted to inform students about the procedures to be followed in case of an emergency. The orientation also includes information and advice appropriate to the program's location for students' personal security and safety.
5. Cellular phones are provided to the faculty leading the program and to students as needed.

In addition, special measures are taken to minimize risks of anti-American threats or terrorism including:

1. Elimination of any signs on the outside of the premises where the students live and study that could identify them as American,
2. Review of State Department information regarding the program venue and advice on any special recommended precautions,
3. Implementation of a plan to contact all students in emergencies,
4. Control of admission to the classroom facilities and warning of students against giving passcodes to any unauthorized individuals, and
5. Advising of students to take the following precautions:
    a. Avoid congregating at American hangouts such as bars that might be targets for terrorists,
    b. Avoid speaking loudly in English when walking with groups of other Americans,

c. Avoid dressing in ways that identify them readily as Americans (e.g., baseball caps on backwards, American college sweat shirts, etc.),
d. Exercise care in whom they invite to visit them at their residence or how much information they give to strangers about their program and its location,
e. Keep abreast of local news through TV, radio, and newspapers, and
f. Stay in touch with their families so that they know their students are safe, and they know where to reach them in case of an emergency or if an incident causes them to worry about their student's safety.

Summary

A new course, entitled "Engineering in a Global and Societal Context" was delivered to 18 university civil engineering students in England for the first time in the spring of 2004. The study-abroad experience was designed to be a three-week, intensive experience. The scheduling of the program, immediately after the end of finals, was timed to permit student to return home for the summer with adequate time remaining to have a summer internship. The course content was designed to enhance the participating students' awareness of global and societal issues impacting and impacted by engineering decisions. Since that time, the course has been delivered 12 more times by a total of 17 different faculty members to over 280 students with five different engineering majors who traveled to a total of 13 different countries.

Bibliography

1. Eydgahi, H. Y., "Higher Education: The Need for an International Education," *Proceedings of the 2002 ASEE Annual Conference and Exposition*, Montréal, Quebec, Canada.
2. Machotka, M., and Spodek, S. "Study Abroad: Preparing Engineering Students for Success in the Global Economy," *Proceedings of the 2002 ASEE Annual Conference and Exposition*, Montréal, Quebec, Canada..
3. Anderson, P. H., Lawton, L., Rexelisen, R.J., and Hubbard, A.C. "Short-term study abroad and intercultural sensitivity: A pilot study," *International Journal of Intercultural Relations*, Elsevier, 30 (2006) 457-469.
4. Evans, J., and McGinnis, R. "Short-term Study Abroad: Engineering in a Global and
1. Societal Context," *Proceedings of the 2006 ASEE Annual Conference and Exposition*, Chicago, IL, June, 2006.
5. Parkinson, A. "Engineering Study Abroad Programs: Formats, Challenges and Best Practices," *Proceedings of the 2007ASEE Annual Conference and Exposition*, Honolulu, Hawaii.
6. Engle, L., and Engle, J. "Beyond Immersion", in Student Learning Abroad: What our students are learning, what they're not, and what we can do about it, Van de Berg, M., Paige, R.M., and Lou, K.H., eds. Stylus Publishing, Sterling, VA, 2012.

Appendix A: Program Administration

Proposals for ENGR 290 are typically requested, reviewed, and approved by the Engineering International Education Committee (EIEC), a committee made up of one representative from each engineering department, one representative from the Engineering Dean's Office, and one representative from the Office of Global and Off-Campus Education. {add criteria for review}. The timeline for proposal submission, review, approval, and course implementation is provided below.

Note that the short proposals referred to in the timeline are expected to address primarily items 1-5 in the list in Figure X, while long proposals are expected to address all 8 items in Figure X fully.

Timeline:

More than two years before course is to be offered:

Dec/Jan:	EIEC requests short proposals for ENGR 290
Feb/March:	Faculty leaders submit short proposals for review
March/April:	Short proposals reviewed by EIEC One proposal selected to be further developed into long proposal the following year Feedback provided to all faculty who submitted proposals

More than one year before course is to be offered:

Dec/Jan:	EIEC requests long proposals for ENGR 290
Feb/March:	Faculty leaders submit long proposals for review by EIEC After any concerns raised by EIEC are addressed, program is approved for following year

Academic year when course will be offered:

Fall (Sept):	Faculty leaders of approved program provide updated budget & dates of program
Fall (Oct/Nov):	Recruitment of students with info sessions and flyers
Before Winter Break:	Students accepted and provided with financial aid offers (if eligible)
Spring (Jan/Feb):	Students commit by paying deposit, plane tickets are purchased

Figure X: Expectations for ENGR 290 Proposals

1) Names and departments of faculty co-directors.
2) A discussion of the theme of the program including:
    a. The theme and major subjects/concepts to be covered in the program (e.g., energy policy, sustainability, natural resources, etc.)
    b. A potential subtitle of the course (e.g. ENGR290: Sustainable Energy and Ecotourism in Costa Rica.)
    c. Why the venue was selected and is appropriate for this theme.
    d. How the class will be relevant to engineering students from a variety of disciplines.
3) The proposed year and how flexible the year is (i.e., is there a specific reason it needs to be that year, or would you be willing to shift a year?)
4) Assessment of any health, safety or liability concerns, and how they will be addressed.

5) A list of course objectives (updated from the model in the template syllabus to reflect the country or countries of interest for your program) and an explanation of how each of the course objectives will be addressed in this course.
6) A preliminary schedule of course activities (such as: sites to visit, field trips, etc), including information on housing and transportation.
7) A draft budget (using the provided template form). University guidance requests costs cap at $6350 if at all possible.
8) The minimum and maximum number of students you think the program could accommodate; a target or preferred number of students can also be included.