

Globalization of Engineering Education – Alabama to Egypt: UAB Civil Engineering Study Away Certificate Programs

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Abstract

In 2007, an international partnership began between the Civil Engineering department at the University of Alabama at Birmingham (UAB) and their counterpart in Cairo, Egypt: Misr University for Science and Technology (MUST). This collaboration was developed not only to enhance cutting edge research but to provide a series of unique educational opportunities to both American and Middle Eastern students.

Globally, there is a strong need to enhance young engineers' comprehension of construction engineering management and the emerging field of sustainable development. This paper will describe collaborative initiatives including: two certificate programs and the recent Master's of Science degree tract. Young engineers are recruited from the US and the Middle East (Egypt Jordan, Palestine, Saudi Arabia) to live and study in Cairo, Egypt for one month. The intensive summer programs offer blended coursework, are instructed from the international community perspective, and allow student participants the unique opportunity to interact with peers from vastly different backgrounds (language, culture, political, religion). These interactions coupled with cutting edge instruction add to their life-long experiences and continuing professional education. Furthermore, US students engage in an additional "cultural awareness" course that focuses on the architectural and engineering practices of both ancient and modern Egypt.

This program aids in the fulfillment of the UAB mission: to provide students with civil engineering education that will enhance their ability to adapt to a rapidly changing global environment, and allow them to create and apply knowledge for the benefit of society. The last three years have been a positive experience for UAB / MUST students, faculty, and program administration. To date, this international effort has seen the graduation of over sixty program participants; a number expected to grow over the next several years.

Background

In 2005, the University of Alabama at Birmingham's (UAB) Department of Civil, Construction and Environmental Engineering began the implementation of newly developed strategic plans in order to enhance both research and academic programs. Among the changes was the adoption of a new vision to: "become a nationally and internationally recognized, research-oriented Department of Civil, Construction, and Environmental Engineering: a first choice for graduate and undergraduate education". However, like many U.S. engineering programs, international collaborations were scarce and rarely extended beyond individual research projects. To rectify this limitation, UAB Civil Engineering faculty were challenged to develop long-term partnerships and investigate new ways to leverage ongoing international research efforts.

In 2007, UAB was awarded the opportunity to co-host a NSF workshop in Cairo, Egypt. During the event, UAB faculty approached Misr University of Science and Technology (MUST) about the potential to create a summer educational program. A memorandum of understanding was quickly adopted and the first collaborative / educational effort was launched in the summer of 2008.

Private universities in Egypt are routinely not authorized by the government to provide graduate education. As a result, institutions like MUST matriculate qualified students interested in pursuing advanced education but lack an accredited Master's or Doctoral degree path. However, as detailed in the UAB / MUST agreement, this obstacle developed into a mutually beneficial opportunity; providing advanced courses to Middle Eastern students and an international education venue for UAB.

Globalization of Engineering Education

UAB currently offers an international graduate program at Misr University for Science and Technology (MUST, Figure 1) that culminates in a Master's of Science in Civil Engineering (MSCE) degree. U.S. and Middle Eastern students enrolled in the program can complete their degree in as little as 14 months; instruction begins in mid-July and ends in mid-September of the following year.

The program is designed for online/blended instruction to facilitate interactions among faculty and students. However, UAB faculty are available on the MUST campus for one month during each summer to provide course instruction and to support ongoing student research projects. The collaborative program is designed to focus on cutting edge information and technologies related to construction engineering management, with particular emphasis on the emerging fields of sustainability and green building construction. These areas of study are fairly new even in the U.S. and as such the program enables students to receive course content that would otherwise not be available within their traditional graduate curriculum.



Figure 1. The MUST Administration Building.

Summer classes are offered over four weeks, five days a week, three hours a day to provide thirty direct contact hours for the enrolled students. An example schedule is provided in Table 1. Three courses each summer are provided by UAB faculty with the remaining class instructed by an appointed MUST faculty (recognized as an UAB adjunct professor). All lectures, class materials and assignments are provided in English. Arabic is the spoken and written language for much of the Middle East; however, MUST was insistent that English predominate to further prepare their students for work in the global economy and to accommodate US students.

Table 1. Example Class Schedule for Summer 2010.

Class Days	Time	Session 1: 2010 July 10th – 21st	Session 2: 2010 July 24th – Aug. 4th
Sat, Sun, Mon, Tue, Wed.	9 – 12 am	CE 603 Construction Accounting and Finance	CE 604 Construction Contracts and Liability
	12 – 1pm	Lunch	
Sat, Sun, Mon, Tue, Wed.	1 – 4pm	CE 600 Sustainable Construction	CE 610 The Engineered Environment

Overall, nine courses (see Table 2) have been designated for instruction in the collaborative program. Supported by numerous faculty, UAB and MUST can ensure quality instruction is provided each summer without schedule interruption.

Table 2. International Program Courses (2008-2010)

	Primary Faculty	Course Title
CE 600	Kirby (UAB)	Sustainable Construction
CE 601	Salama (UAB)	Construction Methods
CE 602	Salama (UAB)	Construction Contracting, Bidding and Estimating
CE 603	Elmisallamy (MUST)	Construction Accounting and Finance
CE 604	Herren / Knapp (UAB)	International Construction Contracts and Liability
CE 606	Elmisallamy (MUST)	Project Management
CE 608	Kirby (UAB)	Green Building Design
CE 609	Herren / Knapp (UAB)	Advanced Topics in Engineering Law
CE 610	Kirby (UAB)	The Engineered Environment

In addition to the aforementioned engineering courses, attending US students are offered Egyptian Civilization Throughout Different Eras (EGYP 430) from the Egyptology department at MUST University. This course engages students in an additional “cultural awareness” that focuses on the architectural and engineering practices of both ancient and modern Egypt. The class includes a variety of field trips (Pyramids, the Nile, Alexandria, etc.) and has been approved for transfer to UAB as a core elective; see Figures 2 and 3.



Figure 2. UAB Students near the Giza Pyramids, Summer 2010.



Figure 3. UAB Students at the Red Sea, Summer 2010.

Graduates from the program (See Figures 4 and 5) receive the following certificates and degree:

- Construction Engineering Management Certificate (12 credit hours, Summer Year 1)
- Sustainable Engineering Certificate (12 credit hours, Summer Year 2)
- Master of Science in Civil Engineering degree (total of 33 credit hours, which consist of 24 hours of certificate coursework plus 9 hours of independent research and master's project)



Figure 4. Faculty with US and international students at MUST campus, Summer 2009.



Figure 5. Faculty with US and international students at MUST campus, Summer 2010.

Program Challenges

Administration of an international program is difficult and time intensive. Each year, program directors must meet enrollment goals (25 students) to remain economically viable. Logistics including classrooms, administrative support, group transportation and coordination of dissimilar academic calendars must be managed. UAB faculty must also serve as the US students' chaperone and liaison between cultures. Despite these challenges, the program's importance to both UAB and MUST have ensured no effort is spared to provide this unique educational experience.

Students have difficulties of their own to endure and overcome. For example, Cairo is one of the most congested cities in the world with regards to traffic. Students that choose to live off-campus must allot up to one hour to commute and a simple trip to the grocery store can result in a daunting taxi adventure. Language is a common obstacle for students. MUST students are strong technically but less comfortable in conversational English. Group assignments and frequent social events are encouraged among peers, thereby promoting all into fast friends. US student travel is likely the most difficult task. Prior to departure, UAB faculty conduct regular seminars on how to arrange air travel, insurance, what to pack, what to eat, etc. This level of supervision has resulted in multiple years of event free participation.

Program Outcome

The expected program outcome is to provide student participants with unique experiences that help to advance their careers, allows them to assume more responsibility, expand their leadership role, and ultimately obtain higher pay. The program presents an educational opportunity for US students to travel/live abroad and for Middle Eastern students to interact and create mutual friendships. Cultural differences are more than just language, food, appearances, and personal habits. A person's culture reflects very deep perceptions, beliefs and values that influence his or her way of life and the way that they view the world. Students that gain this insight are more

prepared to perform in a global environment. Furthermore, study abroad helps students develop skills and grants them experiences a traditional classroom setting cannot provide. This program is an chance to discover new strengths and abilities, conquer new challenges, and solve new problems. Students frequently encounter situations that are wholly unfamiliar to them and must learn to adapt and respond in effective ways.

This program aids in the fulfillment of the UAB mission: to provide students with civil engineering education that will enhance their ability to adapt to a rapidly changing global environment, and allow them to create and apply knowledge for the benefit of society. The last three years have been a positive experience for UAB / MUST students, faculty, and program administration. To date this international effort has seen the graduation of over sixty program participants; a number expected to grow over the next several years.

Based upon the success of the last three years (2008-10), MUST and UAB Civil Engineering are currently preparing the 2011 offering. UAB is also preparing for an estimated 18 Master's and PhD students arriving in 2011 from the Middle East to complete degree requirements. We look forward to continuing this valuable effort and providing a venue for "Globalization of Engineering Education".

Current information on this series of international programs is available at:

<http://www.uab.edu/engineering/international-programs/egypt>