

**AC 2007-169: DEVELOPMENT OF GLOBAL ENGINEERING EDUCATION IN  
CHINA FOR WESTERN MICHIGAN UNIVERSITY ENGINEERING STUDENTS**

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# **Development of Global Engineering Education in China for Western Michigan University Engineering Students**

## **Abstract**

In collaboration with Sichuan University in China, Western Michigan University had established and developed the China Summer Engineering Tour for the first time in 2006 and is in the process of launching a second tour in 2007. The program is designed to provide a unique opportunity for both undergraduate and graduate students to obtain global engineering experience in contemporary China. Participants study at the prestigious Sichuan University for three weeks including visiting Beijing, Xian, Chengdu and its surrounding areas. The program includes lectures, engineering field trips and engineering demonstrations. Experienced engineers and faculty members in China are invited to lecture on special topics and advanced engineering experience. The topics may cover chemical, mechanical, electrical, manufacturing and computer engineering. Four engineering field trips are arranged through Sichuan University. The field trips include visiting chemical, pharmaceutical and information technology companies in the Chengdu area as well as 2600-year-old Dujiangyan Irrigation System. Lectures and seminars on local Chinese culture including painting, music and medicine are also included. This three-week program allows students to explore global engineering opportunities and strengthen working skills with global engineering disciplines. Students are directly interacting with Chinese faculty, engineers and students at the university and at engineering facilities. All instruction is in English. The program is open to all engineering students.

## **Introduction**

China is one of the most economically dynamic countries in the world with a population of about 1.3 billion people. China attracted more than \$60 billion of foreign investment last year. It is our third largest trading nation with about \$1.2 trillion in foreign trade with gross domestic product of about \$2 trillion in 2004.

Statistics show that China is now the world's 6th-largest economy, trailing Britain and France. With rapid economical development in China, many multinational companies and financial institutions have established their Far Eastern headquarters in China. American and Western manufacturing companies have moved many of their production lines to China. For example, the largest paper machines in the world were recently installed in China. The Microsoft Research Institute established its new operation in Beijing. Consequently, higher education markets in China are rapidly expanding. In 2005, Mainland China had more than 3000 higher education institutes, with a total student enrollment of about 22 million--the largest student body in the world.

In response to the development of its global economy, more students are trained in the areas of electrical, computer and information technologies, and biological, chemical, mechanical and manufacturing engineering. It is obvious that American companies in China could provide job opportunities for US engineering graduates and could also be a potential market for American universities.

To globalize Western Michigan University education and promote its international reputation, WMU President Judith Bailey signed an agreement with President Heping Xie of China's Sichuan University to establish a strong collaboration in student and faculty exchange and in all teaching and research areas. This agreement allows students to visit their counter partner and take courses in their visiting university. WMU faculty may have opportunities to teach and conduct research at Sichuan University.

Sichuan University is one of China's top universities. It has 52,000 students, including 17,866 MS and PhD students. It offers various degrees, including 168 PhD, 254 MS, 118 BS and 21 post-doctoral fellow programs in medical, laws, science, business and engineering schools. It is located in Chengdu, population 10 million. The collaboration will benefit both universities.

### **Description of the Project**

To facilitate the agreement between the two universities, we have established a new program entitled "Engineering Tour in China." The purpose of the program is to encourage WMU engineering students to participate in a global education experience, to get international engineering experience and to promote faculty and student exchange with Sichuan University. A new curriculum for the global engineering tour (ENG 3400) is developed and recently was approved by the university.

Due to a popular demand and in collaboration with Sichuan University, we are conducting the tour for the second time this summer. The program is designed to provide a unique opportunity for both undergraduate and graduate students to obtain global engineering experience in contemporary China. This global experience is designed to better position our students in international learning and global education, and prepare them to work in a global industry. The tour gives WMU students global awareness of different engineering practices, thereby qualifying them for the global market. Studies of design, business, manufacturing, problem solving, quality control, and supply chain management practices developed in non-western countries, that have different cultural and historic backgrounds, are conducted. In addition, student will be exploring trade practices, copyright and patent protections, research protocol review boards, political practices, etc. Alternative views of engineering and modern technology to stimulate reflections on their characteristics from a global prospective will be examined.

The participants depart on May 11 after Spring Semester and return on June 5. Enrollment will be in Summer I. Lectures, engineering field trips, and demonstrations are all already arranged. Academic support will be provided by Chemical Engineering College at Sichuan University. Housing and food services will be provided by the International Affair Office of Sichuan University, which has a Foreign Student Resident Hall.

In the past, there is no one course available in our engineering curriculum for students to take and be counted toward their graduation. We created a new course, International Engineering Study Abroad in Non-Western Countries that was approved by the faculty and the university. This course includes five components: international travel, engineering seminars, engineering field trips, student presentation and final written report and exam.

All lectures, seminar, field trips, presentations and exam should be carried out at the hosting universities. A course Pack focused on the culture and language was developed and required reading by participants during pre-visit orientation.

20 students participated in the program last year and we are planning to attract 20 WMU students to participate in this program in 2007.

The program itinerary is given below.

## **Impact**

This project will certainly enhance the international reputation of WMU in engineering teaching, learning and research. WMU students will benefit from the international engineering experience. It is possible for them to explore the working and practical opportunities in China. It is expected that more and more WMU students will establish their global skills in engineering areas.

According to recent statistics, the number of American students studying abroad for academic credit increased by 9.6% in 2003/04, building on the previous year's 8.5% increase. Allan Goodman, President of the IIE, states, "Many U.S. campuses now include international education as part of their core educational mission, recognizing that increasing the global competence among the next generation is a national priority and an academic responsibility. To encourage more U.S. students to strengthen their language and intercultural skills, as well as their ability to collaborate across borders, business leaders need to demonstrate the economic value of study abroad by rewarding international experience in their hiring and advancement practices."

Study abroad in non-traditional destinations is expanding rapidly, especially to countries where American students see potential career opportunities. Of particular note are large increases in the number of Americans studying in China and India, two countries of growing economic importance to the United States. Study abroad in China increased by a dramatic 90% (4,737, up from 2,493 in 2002/03), making China the 9<sup>th</sup>-leading host destination for American students.

American students continue to study abroad in larger numbers but for shorter time periods, with a continued decline in popularity of traditional semester and yearlong programs. Only 6% of students who studied abroad did so for a full academic year (compared to 14% a decade ago in 1993/94), while 38% studied abroad for a semester. The majority (56%) of U.S. students elected summer term, and other programs of less than one semester. These short-term programs have played an important role in increasing the popularity of study abroad, offering international study opportunities to students who might otherwise have been unable to afford to participate in traditional-length programs. The WMU 25-day Engineering Tour in China embraces the knowledge that students want shorter, but still intense, study abroad opportunities to give them a definite competitive edge upon graduation. Western Michigan University is positioning itself with other future-minded universities in offering students global study opportunities.

## Program Itinerary

Sat	Sun	Mon	Tue	Wed	TH	Fri
					May 11: Depart from Kalamazoo	
May 13: Arrive at Beijing	May 14: Tiananmen Square, Forbidden City, Beihai	May 15: Ming Tomb, The Great Wall, Badaling; Dinner- Beijing Roast Duck	May 16: Beijing Hutong Tour; transfer to the train to Xian	May 17: Emperor Qin Shi Huang's Terra Cotta Warriors, Huangqing Spring Pool, Wild Goose Pagoda	May 18: Ancient Wall, Forest of the Stone Tablet Museum, Great Mosque; train to Chengdu	May 19: Arrive at Chengdu orientation dinner with Chinese students
May 20: Visit Leshan	May 21: Visit Emei Mountain; return to Chengdu	May 22: 8:30-12:00 Lecture on chemical engineering afternoon visit labs	May 23: 8:30-12:00 Lecture on mechanics; visit labs; afternoon visit US Consulate	May 24: 8:30-12:00 Visit China National Erzhong Group Co.; afternoon visit labs	May 25: 8:30-12:00 Lecture on electrical; visit labs; afternoon visit Wangjiang Park	May 26: 8:00-12:00 Lecture on local culture; afternoon party with Chinese students
May 27: Visit Panda Park; evening Sichuan Opera Show	May 28: Visit Dujiangy Irrigation System and Qincheng Mountain	May 29: 8:30-12:00 Lecture on chemistry; visit labs; afternoon lecture on foreign investment in Chengdu; visit High Tech Zone	May 30: 8:30-12:00 Lecture on Taiji; afternoon visit Nationality University Museum; dancing party after dinner	May 31: 8:30-12:00 Lecture on biological engineering; visit labs; afternoon visit Intel Company	June 1: Lecture on Chinese acupuncture; afternoon visit Sichuan Chemical Engineering Company	June 2: 8:30-12:00 Lecture on calligraphy and painting; afternoon Final Exam
June 3: Party with Chinese students and shopping	June 4: Fly to Beijing; visit US company in Beijing	June 5: Fly to Kalamazoo				

