

Analysis of an Evolving Global Engineering Education Program between China and the US

Lisa Anneberg [lanneberg@ltu.edu], Lawrence Technological University, Southfield, MI , Luo Suyun [lsyluo@163.com] and Zhang Hui [zhanghui@sue.edu.cn], Shanghai University of Engineering Science, Departments of Automobile Engineering and Electrical and Computer Engineering.

Abstract

Our paper analyzes specific aspects of a Global Engineering program that has been evolving since 2003. Lawrence Technological University in Southfield, MI [LTU] and Shanghai University of Engineering Science [SUES] have and have had other global programs with other universities. For instance, LTU has an ongoing program with Wenzhou University [WU] in China. However, WU is interested only in two classes. SUES has an ongoing program with St. Cloud State University in St. Cloud, MN [SCSU]. This program comprises special seminars at both SCSU and SUES. But the LTU/SUES partnership is enduring, expanding and evolving, and now comprises over twenty courses in four SUES degree programs. The focus of this paper is an overview of the growth and specific evolving mechanisms, as well as lessons learned from participating administrators and professors. Some statistics about the program will be analyzed as well.

Keywords

Global engineering education, United States and China

Overview

Lawrence Technological University [LTU, 1] and Shanghai University of Engineering Science [SUES, 2] were founded in 1932 and 1978, respectively. These specific particular dates represent two unique timeframes in the two countries where farsighted individuals implemented their “dream of preparing students for leadership in the new technical era into reality.” [1] The motto of LTU is “Theory and Practice”, while SUES “integrates classroom-based learning with work-based learning.”[2] Our two universities share similar student populations, mission/vision, and leadership.

In fact, the vision of LTU is "To be a pre-eminent private technological university producing leaders with an entrepreneurial spirit and global view." Likewise, SUES is “devoted to seizing every opportunity to cultivate talented students with global vision so as to become a modern and international institution of higher education in the future.” However, actual implementation of this global engineering education program has taken hard work, from the students/professors/administrators.

Course Specifics

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Each year, the list of courses is tailored for the SUES audience, and implemented by LTU full and adjunct faculty. Some courses are taken by both Automotive and Electrical engineering undergraduates: project management, engineering quality control, and so on.

LTU and SUES have had this evolving collaborative global engineering program since 2003. It began with two important classes: Engineering Economic Analysis and Introduction to Automotive Principles. These courses are typical in American engineering undergraduate programs, and became stalwarts in the SUEs undergraduate programs as well. The total number of students in 2003 was 120 sophomores and freshmen automotive engineering students. The next year, Engineering Materials, Matlab Programming, and Engineering Quality Control were added. For the 2015-2016 academic year, the list of courses include:

Principles of Economics

Computer Engineering Laboratory

Engineering Cost Analysis

Statics

Technical and Professional Communications

Circuits and Electronics

Advanced Manufacturing Processes

Introduction to Thermal Systems

Engineering Project Management

Introduction to Automotive Principles

Mobile Electronics

Analog Electronic Technology

Automotive Applications of Microcontrollers

Image Processing

Introduction to Engineering

Introduction to Electrical and Computer Engineering

Digital Electronic Technology

Circuit Analysis

Advanced Programming

Computer Networking

Electrical Machinery

VLSI Systems

Control Systems

Essentials

Two items have emerged as essential elements in the success of the program. First, SUES professors have been extremely proactive in acclimating the LTU professors. Key points for this success: thorough syllabus review, student management, and incorporation of LTU specifics into the curriculum. For instance, LTU student presentations are adapted for SUES students with very good results. Secondly, SUES and LTU administrators are incorporating various techniques for success. These techniques include professor collaboration, annual reviews, and open communication.

Student Assessment

Student assessment of the main idea of the SUES program is given in Table 1. The data is from [3].

The conclusion of the LTU/SUES program was that students value the new ideas and theories that they learn from the LTU professors.

Conclusion

The LTU/SUES collaboration has been evolving and enduring. A Chinese Ministry of Education Accreditation visit to SUES in the summer of 2015 yielded the stamp of approval for the 25 courses and a vote of confidence for the future of the program. Two full-time LTU faculty members will be hired for each Program: Automotive Engineering and Electrical Engineering. The global nature of the program is ensured, and we all hope the the expanded program will continue to improve and meet its global mission.

References

- 1 Lawrence Technological University and history: <https://www.ltu.edu/news/history.asp>
- 2 Shanghai University of Engineering Science and history: <http://en.sues.edu.cn/s/640/t/323/LTU,p/1/c/12073/d/12082/list.htm>
- 3 Luo Suyun and Lisa Anneberg, Student Attitudes on a Collaborative Engineering Undergraduate Program between USA and China, 2011 ASEE North Midwest Conference.

Lisa Anneberg

Lisa has been with LTU for twenty-five years in the department of electrical and computer engineering. She primarily teaches digital courses.

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Luo Suyun

Suyun has been affiliated with the Automotive Engineering College at SUES for fifteen years. She is presently a vice dean of student-faculty affairs also teaches.

Zhang Hui

Zhang Hui has been affiliated with SUES for 13 years, and he is in the Electrical and Computer Engineering College.

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