

Development of an International Engineering Leadership Program to Prepare Students to Function in Global Society

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ABSTRACT

This paper presents Wright State University's (WSU) International Industrial/Academic Leadership Experience Program in collaboration with Ernst-Abbe-Fachhochschule Jena (EAFJ). WSU's International Engineering Leadership Program is systematically integrated and involves academic programming that including design and research elements, cultural education, and professional development. Through involving the students in a multi-cultural experiential learning process, students are able to appreciate engineering and technology components that: (1) expose them to applied and cutting-edge technologies; (2) encourages them to participate in a team integrated learning experience; (3) involves them in methods of applied technology and human interactive-skills necessary to transition from academic to global professional environments; and allows them to appreciate diversity.

Keywords: International, Engineering, Curriculum, Diversity, Leadership

1. INTRODUCTION

It is evident in order to maintain United States' academic leadership in the face of increasing globalization; U.S. universities must concentrate on fostering innovation and entrepreneurial international activities¹. As the global economy has developed, universities and corporations have been able to leverage the equally effective human capital of previously untapped nations to increase collaborations and productivity while dramatically reducing costs and improving their bottom line².

Wright State University's College of Engineering and Computer Science Program is developing a Bachelor's Degree in Mechanical Engineering with a Manufacturing concentration at WSU-Lake Campus in Celina, Ohio. As one key element of our students' educational experience, we propose to offer the International Industrial/Academic Leadership Experience Program in collaboration with EAFJ. The WSU-Lake Campus International Industrial/Academic Leadership Experience Program explores incremental student's education training and academic enhancements, breakthrough engineering education innovation, and leadership. Engineering education innovations occur as a result of the application of technical knowledge of the components and their relationships towards learning, pedagogical processes, and techniques that make up engineering professionals or provide service and civic engagement. The proposed program prepares the students for innovation and International Engineering Leadership through six key goals. These are: (a) To expose participants to leadership concepts from both a global and engineering perspective: This goal is achieved through a combination of core classes and specific technical tracks outlined in this proposal; (b) To emphasize problem solving and creative thinking: This goal is achieved through specific study abroad programming including core classes such as technology-based team-work with foreign counterparts, language arts, cultural skills, etc.; (c) To provide participants practical international industry experience from concept development in preparation for market introduction: A required industry tour and education with an industry sponsor

is an integral part of the program which focuses on achieving this goal; (d) To expose students to multiple engineering and business disciplines and to work in global, multi-cultural teams: In addition to shorter term projects in specific program components, a semester-long team project is geared towards achieving this goal; (e) To provide participants the opportunity to interact with, and learn from, German high tech entrepreneurs: A required course for the students is a seminar on entrepreneurship and innovation, where guest lecturers provide insight on Germany's entrepreneurship and innovation; and (f) To produce graduates who have the technical expertise and a keen understanding of the global leadership environment needed to succeed in entrepreneurial activities: This goal are achieved through the core components, technical tracks, and the team project.

2. DESCRIPTION OF THE PROPOSED CURRICULUM

The International Engineering Leadership program is comprised of four (4) total credit hours. The program includes four components: (1) Language Arts, (2) Engineering Academic Experience, (3) Business and Leadership, (4) Cultural Experience. To satisfy the course requirements, the students submit a report related to the leadership experience. The cumulative grade is based on performance in each of the program's components. The WSU-Lake Campus International Industrial/Academic Leadership Experience Program components in detail are:

Language Arts: German language arts component starts at the WSU Lake Campus prior to the students' travel to Germany. Language Arts studies continue throughout the program and during the students stay in Germany. Language arts focus on the students' need to communicate and function within the German society. The goal of this component is to allow them to interact with their student peers and mentors.

Engineering Academic Experience: This component focuses on cultivating innovative characteristics such as: cognitive and analytical skills, ingenuity, and creativity to prepare future engineers to be global citizens and leaders in business and public service. The goal is to address the context within which engineering education must

train students to anticipate professional, geopolitical, economic, and societal needs. The students learn how the evolution of technological advances impacts the world and the future of engineering. Students from the two schools work together and build an engineering system. This exciting program requires collaboration between students from diverse engineering fields such as mechanical, materials, electrical, and computer science in order to research, design, construct, and implement an engineering system. The design program stimulates learning about complex engineering systems and enables students to accomplish these important engineering skills: (1) Wireless communication, (2) Control system design, (3) Data analysis for computing, etc.

Business and Leadership: This component is achieved through a collaboration with Crown in Roding (Crown Equipment headquartered in New Bremen, Ohio with a facility in Celina, Ohio is a valuable Lake Campus partner) and other local industry in Jena such as Carl-Zeiss. Students are able to understand the similarities and differences in the engineering industry of the United States and Germany. This also serves as an opportunity to observe a global economy in action as well as how companies function in an international setting.

Cultural Excursions: The students have an opportunity to visit museums in Germany and be exposed to art/theatrical activities; cultural side trips; German national parks and German traditions and culture. This exposure allows students to appreciate how other world citizens live and function. Germany is specifically targeted for the international program given that the area surrounding Celina is populated with families whose descendants are originally from Germany. The students are able to compare/contrast German and American cultures.

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