

## **Proposing a University Core Course in Leadership Innovation in Engineering**

### **Dr. Peter Golding, University of Texas at El Paso**

Professor in the Department of Engineering and Leadership at UTEP.

### **Mr. Mike Thomas Pitcher, University of Texas at El Paso**

Mike Pitcher is the Director of Academic Technologies at the University of Texas at El Paso. He has had experience in learning in both a traditional university program as well as the new online learning model, which he utilizes in his current position consulting with faculty about the design of new learning experiences. His experience in technology and teaching started in 1993 as a student lab technician and has continued to expand and grow over the years, both technically as well as pedagogically. Currently he works in one of the most technically outstanding buildings in the region where he provides support to students, faculty, and staff in implementing technology inside and outside the classroom, researching new engineering education strategies as well as the technologies to support the 21st century classroom (online and face to face). He also has assisted both the campus as well as the local community in developing technology programs that highlight student skills development in ways that engage and attract individuals towards STEAM and STEM fields by showcasing how those skills impact the current project in real-world ways that people can understand and be involved in. As part of a university that is focused on supporting the 21st century student demographic he continues to innovate and research on how we can design new methods of learning to educate both our students and communities on how STEM and STEAM make up a large part of that vision and our future.

### **Dr. Diane Elisa Golding, University of Texas at El Paso**

Diane is a passionate educator and proponent for K-12 engineering education and the education of future teachers. She is an assistant professor at the University of Texas at El Paso (UTEP). Diane serves as the director for the UTEP YES! She Can program that support minorities and minorities within minorities in personal and STEM self-efficacy. She earned her undergraduate and graduate degrees from UTEP and holds a doctorate from the Rossier School of Education, University of Southern California.

### **Dr. Cole Hatfield Joslyn, University of Texas at El Paso**

Cole Joslyn is an Assistant Professor of Practice in the Department of Engineering Education and Leadership at The University of Texas at El Paso. His research emphasizes humanizing engineering education, particularly 1) increasing Latinx students' sense of belonging in engineering by a) integrating holistic, socio-culturally responsive practices and Latinx cultural assets and values into educational success strategies, and b) understanding how Latinx students experience values conflicts and exploring how to help them reconcile those conflicts; 3) promoting student growth/development in multiple dimensions; and 4) reconciling the social and technical nature of engineering.

### **Ms. Anneliese Mari Fensch, University of Texas at El Paso**

Anneliese Fensch is a student at her university's Engineering Innovation and Leadership program. In the program, she is employed as a teaching assistant for introductory classes. As well, she serves as a research assistant for the program, developing curriculum and methods to instruct engineering classes. She has a concentration in mechanical engineering and is pursuing a minor in Political Science - Public Administration. She hopes to apply her education to pursue a career in renewable energy engineering and research. Outside of classes and work, Anneliese is the vice president of the university's Green Team, an organization focusing on sustainable development at the university, and the external relations chair of the university's Society of Women Engineers chapter. She enjoys writing and spending time with her family and pets.

## ABSTRACT

Self-development, with the goal of students becoming more effective leaders and team players, is a primary goal of 21st Century universities providing value. Innovation and leadership skills learned in this course have application to personal and professional relationships, work and lifelong learning goals. This paper details the proposal for a new addition to the Core Curriculum at The University of Texas at El Paso being designed to meet these skills: EL 1301, an entering students' course in Engineering Innovation and Leadership. Through the course, engineering students will gain a foundation of knowledge of innovation, technological and leadership advancement in modern society, develop principles of personal, professional and social responsibility for living in a diverse world, and advance intellectual and practical skills that are essential for all learning. The course foundational component area intent includes foci on all six Texas Common Core Objectives: Critical Thinking Skills (CT), Communication Skills (COM), Empirical and Quantitative Skills (EQS), Teamwork (TW), Social responsibility (SR) and Personal Responsibility (PR). We detail these objectives and the methods of assessment.

Through this course students will learn about themselves, about others, and about innovations (change) and engineering sciences. Students will learn through inquiry of the process by which arts, business, science and mathematics are utilized to develop critical thinking competencies, and though engaging in creative thinking will enhance their self-learning and future success. The empirical results of cognitive science will be used to illustrate the importance of understanding preconceptions, cognitive frameworks, and metacognition. Students will be able to apply this inquiry-based framework to research, scholarship, and learning with the goal of using UTEP Edge experiences to build success in their future in engineering.

This course advances individual leadership development through providing a framework for understanding the elements of innovation and organization's leadership development system. The course provides students with the foundations of leadership and innovation capacity in organizations. This course ties together and integrates many initiatives stemming from different areas of expertise with the primary goal to be to present knowledge in a way that students can use in their efforts to create leadership development experiences. We will specifically focus on how leadership skills effect the outcomes of engineering processes and engineering teamwork so as to enhance both individual and organizational leadership capacity.