

## **Introducing Innovation to First-Year STEM Students through an Intercession Course**

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### **Abstract**

Innovation training is considered critical for the future of our country, yet despite the important role, opportunities for students to develop innovation skills are limited. For STEM students, training in innovation principles and processes are frequently extra-curricular pursuits, such as unpaid internships with start-up organizations, shadowing innovation professionals, or obtaining an additional business degree or minor covering innovation principles. The National Science Foundation has funded the authors (Schubert (PI), Gattis (co-PI), et. al.) with a Science, Technology, Engineering and Mathematics (S-STEM) grant to provide scholarships combined with research on best practices for recruitment, retention, and development of innovation skills for a diverse group of low-income undergraduate students. Students in the program come from STEM disciplines in engineering and the physical sciences, however, business students are also integrated into innovation courses although they are not funded by the S-STEM grant. Design, development, and implementation of the grant-funded program's first innovation related course, a 2-week fall intercession course, will be presented. This first-year course is designed to provide the students with an introduction to innovation, develop and nurture the students' innovation mindset and skills, and also help the students' successful transition to college.

The first-year two-week intercession course was designed and developed with two credit hours focusing on content related to innovation and one credit hour focusing on student success topics. The significant academic course components included: 1) interactive active-learning modules related to innovation processes, identifying where good ideas come from, working in teams, leadership, project management, and communication and presentation skills; 2) team innovation projects, one topic-assigned, applying skills learned in the content modules to develop innovation and team collaboration skills; and 3) integration of business students with STEM students which together gives viewpoints and experiences on product and customer needs.

It is important to our nation's health and safety to instill innovation in our students. In addition, today's students are interested in innovation and in learning how to apply innovation techniques in their professional and personal lives. The course was designed for teams of four STEM students to one business student which provides a balanced input needed for this type of project taking into account the skillset of the technically oriented STEM students and the marketing-oriented business students, as well as personality types. This ensures that all voices are heard, and topical areas are addressed.

There was no problem in getting faculty interest in developing the course, and the collaboration between retention professionals and faculty went well.

After the course, an iterative improvement retrospective will be performed on the program as implemented to this point to inform improvements for next year's cohort

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### **Keywords**

Faculty Paper, Interdisciplinary Innovation, Industry Collaboration, Diversity, Course Development

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Ms. Massey is an instructor in the First-Year Engineering Program at the University of Arkansas. She received her BS in Biological Engineering and MS in Environmental Engineering from the University of Arkansas. She previously served as project manager at the Arkansas Water Resources Center but returned to the University of Arkansas in 2013 to teach general Introduction to Engineering and to coordinate the First-Year Honors Innovation Experience.

### **Carol Gattis, Ph.D.**

Dr. Gattis is the Associate Dean Emeritus of the Honors College and Adjunct Associate Professor in Industrial Engineering. She has 30+ years of successful educational program design, development, and research relative to engineering and honors student recruitment, retention, diversity, international education, and course development. She has served as PI/co-PI on four NSF S-STEM grants.