Design Thinking and Community-Based Design Course

Facilitated by Dr. William Oakes, Director of the EPICS Program

Purdue University

This workshop series is designed to provide an overview of design thinking and engage participants in considering how these elements could be integrated into their own courses. At the end of the workshop, participants will be able to:

A. Describe the components of design thinking
B. List attributes of expert designers
C. Employ prototyping into their design experiences
D. Discuss the importance of users in the design process
E. Explain how design thinking can be integrated into their own courses

1. Session 1
   a. Introduction to Design Thinking
      i. Characteristics of design thinking
      ii. Expert and novice design characteristics
      iii. Opportunities for student to learn skills needed for the development of expertise
   b. Case study for design thinking success
      i. Creating a culture of design learning
      ii. Gathering information from users
      iii. Rapid prototyping

2. Session 2
   a. Users and community partners
      i. Understanding users
      ii. Identifying users
      iii. Creating tools for understanding users
   b. Requirements and specifications
      i. Defining specifications
      ii. State of the art comparisons
      iii. Testing requirements

3. Session 3
   a. Prototyping
      i. Prototypes for technology
      ii. Prototypes for communication

4. Session 4
   a. Ideation and concept generation
      i. Brainstorming
      ii. Concept generation
      iii. Functional decomposition
b. Testing and design to prevent failures
   i. Testing of designs
   ii. Design for Failure Modes and Effects Analysis (DFMEA)
   iii. Delivery to users

5. Session 5
   a. Teaming concepts in design
      i. Managing student teams
      ii. Organizing teams
      iii. Assessing teams
      iv. Mentoring and advising teams
   b. Closure and summary
      i. Reviewing design cycles and concepts
      ii. Putting it into action

Facilitator

Prof. William Oakes, P.E
150th Anniversary Professor
Director, EPICS Program
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William (Bill) Oakes is a 150th Anniversary Professor, Director of the EPICS Program, Professor of Engineering Education at Purdue University, and a registered professional engineer. He is one of the founding faculty in the School of Engineering Education having courtesy appointments in Mechanical, Environmental and Ecological Engineering and Curriculum and Instruction. He was the first engineer to receive the U.S. Campus Compact Thomas Ehrlich Faculty Award for Service-Learning. He was a co-recipient of the U.S. National Academy of Engineering’s Bernard Gordon Prize for Innovation in Engineering and Technology Education. He is a fellow of the American Society for Engineering Education and the National Society of Professional Engineers.