

Design Thinking and Community-Based Design Course

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

Purdue University

This workshop series is design 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
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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.