



## Introduction to Engineering Standards in Capstone Design

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# Outline

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- ABET Criteria
- Engineering standards
- Including “considerations” in design
- Assessment opportunities
- Opportunities to enhance general education
- Summary

# ABET Criterion 4

- Students must be prepared for engineering practice through the curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political

# Engineering Standards

- Codes
- Standards
  - Specifications
  - Test methods
- Technical regulations
- Conformity assessment
- Management systems standards

# Health, Safety and Environment

- Technical regulations (mandatory standards) that apply
- Building code considerations
- Environmental management system
- OSHA
- EPA
- FDA

# Conformity Assessment

- Conformity assessment issues may also have to be addressed
- Will the product have to be listed or certified? (for example, UL)
- Is the product a systems component and will have to meet specifications?
- How is compliance determined?

# Capstone Courses and Outcomes Assessment

- Capstone courses can be a good place to focus assessment activities
- Some of the considerations provide good summative assessment opportunities
- They can also provide good opportunities to relate the technical and general education components of the curriculum
- Standards could provide one unifying theme in technical education.

# ABET Criterion 3

Engineering programs must demonstrate that their graduates have:

- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues



# Standards Assessment Opportunities

Complete ANSI courses online courses on introduction to standards, national standards systems and international standards system - an online certificate is awarded - (i) life-long learning

Present short report on standards and codes applying to project - (g) communications

Research potential international barriers to a product e.g. EU regulations on waste reduction and recycling related to electronic products (h) understand the impact of engineering solutions in a global and societal context

Review proposed standards on corporate social responsibility and there potential effects on industry practices - ethics (f), contemporary issues (j)

# Opportunities to Enhance General Education

- For some of the considerations students need to address in design, the requisite knowledge and background to discuss them could (must?) come from non-engineering courses or special engineering courses designed to supplement general education.
- There is a an opportunity to assess students general education and how it complements the technical education.
- This feedback can be used to modify/improve the general education component

# Summary

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- Criterion 4 requires incorporation of engineering standards - workshop will attempt to show you “how to”.
- Criterion 4 “considerations” have standards aspects discussion of which from an engineering perspective can contribute to and complement students’ general education.