Freshmen Engineering
ENGN 110 – Section #2

An Introduction to Design and Concurrent Engineering
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What is Design?

- Fundamentally, design is any activity that results in the creation of something that meets a need.
- From an engineering perspective, the combination of some body of knowledge and specialized skills is synthesized in the design to result in a device, machine, mechanism, structure, process, etc... that meets a set of desired specifications.
Good Design versus Bad Design

The following questions will qualify the design as good or bad:

- Does it work?
- Does it meet technical requirements?
- Does it meet Cost requirements?
- Is it durable?
- Is it safe?
- Is it ethical?
The Design Process

- Define Overall Objectives
- Choose Design Strategy
- Collect Information
- Make a First Cut At the Design
- Build a Prototype
- Revise
- Test

Loop:
- Does it Meet specs?
  - no
  - Revise
  - Build a Prototype
  - Test
- yes
  - Test Final Product
Traits of a good Engineer

- Open to new ideas
- Consider a variety of solutions before choosing a design approach
- Pay attention to testing and retesting
- Avoid trial and error
- Use phrases such as “I need to understand why” and “Let’s consider all possibilities”
Concurrent Engineering

- Simultaneous developments of all aspects of a design, by means of teamwork, from the initial concept to its manufacture, maintenance, and disposal in order to optimize the performance and quality of a product and minimize its cost and production time.

- CE uses “Design for X” approaches where X could be manufacture, assembly, reliability, quality, packaging, maintainability, disassembly, recycling, etc...
Concurrent Engineering (Ctd)

- Antithesis of serial manufacturing
- Benefits:
  - Reduced manufacturing lead time
  - Reduced cost of production
  - Improved quality
Concurrent Engineering Requirements

- Top Management Commitment
- Strategic Vision
- Teamwork
- Enabling Communication technology