Engineering Design Process

The work that engineers do is sometimes described by the "engineering design process." Engineering students will use this process in various engineering courses. The exact steps may vary and the process is often iterative.

Engineering Design Process:

1. Recognizing the Need for a Product or a Service
2. Problem Definition and Understanding
3. Research and Preparation
4. Conceptualization
5. Synthesis
6. Evaluation
7. Optimization
8. Presentation

Engineering Design Process

Many stages of the engineering design process will involve the need for drawings and for analysis. EGR 110 introduces two powerful tools that will be very useful in the engineering design process:

1) AutoDesk Inventor
   - Produce solid models of parts
   - Produce assembly drawings showing how the parts fit together
   - Produce detailed drawings
   - Use parametric modeling features to easily modify designs and to explore new solutions
   - Use constraints to insure proper dimensioning
   - Use constraints to test motion of moving parts
2) MatLab
   - Perform various types of analysis
   - Graph results to illustrate performance as parameters vary

Engineering Design Process:

1. Recognizing the Need for a Product or a Service
2. Problem Definition and Understanding
   - *Sketching and CAD used for preliminary drawings*
3. Research and Preparation
4. Conceptualization
   - *CAD (especially parametric modeling software) allows the designer to easily modify designs and experiment with new concepts.*
   - *MatLab used for calculations related to various types of designs*
5. Synthesis (or design)
   - *MatLab used to achieve desired design objectives.*
   - *CAD used to work out the exact details of the design. Specify and verify dimensions, tolerance, range of motion, etc.*
6. Evaluation
   - *CAD and MatLab used to evaluate performance.*
   - *Use CAD to interface with machines (CAD/CAM)*
7. Optimization
   - *Use CAD to adjust design parameters to improve performance.*
   - *Use MatLab to perform calculations to improve performance*
8. Presentation