Educational Objectives of MAE156A
Design today is dominated by two facts:

- Technology is changing quickly, so engineers need to develop life-long learning skills and to interpret new technology in the context of the underlying physics.
- There is intense worldwide competition, and optimization is often required.

MAE156A is a transition course between MAE3 and MAE156B. We expect a higher level of integration of analysis into design than in MAE3, and we focus on good design practices that will be critical for your sponsored project in MAE156B.

Mechatronics Project: Weeks 1-6
Multidisciplinary projects are at the leading edge of many technological breakthroughs since a wider range of design solutions are possible. Advances in materials, microfluidics, or sensors can change design choices in other areas. In MAE156A, we will use a Mechatronics project as a vehicle for learning multidisciplinary design. Mechatronics products are those where mechanical and electronic components are tightly integrated. As electronics have become more pervasive, mechanical engineers need to become familiar with integrating microprocessors, sensors, and software into their designs. One of the major differences between MAE3 and MAE156A, is that as seniors students in MAE156A have completed the majority of their theoretical courses. Accordingly, design decisions should be justified based upon engineering analysis.

Mechanical Component Selection
An important engineering skill is how to select which components to use in a project. In MAE156A we will develop skills of using specification sheets, company websites, and design guides.

Beginning of Sponsored Project: Week 7-10
We will start industry and research sponsored projects in week 7, and teams will be formed by instructor based upon student preference forms. This project will be completed in 156B.

Machine Shop Course: Weeks 4-10
The machine shop course runs concurrently with the Mechatronics project. One objective of the course is for students to become familiar with precision machining methods on the lathe and mill. As a practicing engineer it is important to be familiar with manufacturing processes so that one can apply Design For Manufacturability (DFM) to one’s designs. Some challenges are:

- When designing a part, go through the manufacturing steps in your head.
- Design parts that function well with easily achievable precision requirements.
- When machining a part, select the best order of operation.

iClickers Required Starting Lecture 2
Studies have shown they increase retention even when answers are wrong. Most questions 75% for participation and 100% for correct answer. Speculative questions 100%.