

ME357: Introduction to Computer Aided Design (CAD) & Machine Components – Spring 2020

Instructor and Class Information

Instructor: Scott Morris

Contact Info: semorris@bu.edu

Office Hours: Scheduled as needed

Office Location: ECL or Zoom meeting Sections: A1 and A2

Course Websites

- Notes, Assignments & Course Schedule: Blackboard Learn (<http://learn.bu.edu>)
- Q&A Forum: Piazza, <http://piazza.com/bu/other/buengme357359/home>

Course Description

Modeling and technical drawing in two- and three-dimensions is covered in detail using advanced computer aided-design (CAD) tools. CAD-based assembly, mechanism creation, and finite element analysis (FEA) are introduced. Geometrical dimensioning and tolerancing methods are applied to a variety of tasks and a course project. Other topics include design for manufacturing and assembly, specification and analysis of basic machine components, including gears, bearings, cams and the relationship of those components to modern manufacturing processes.

Learning Objectives

1. Master an array of two- and three-dimensional modeling techniques using modern CAD software
2. Apply standard drawing, dimensioning and tolerancing practices to analyze and specify drawing dimensions
3. Become familiar with basic machine components and their role in engineering design
4. Understand the various types of mechanical fits
5. Learn about the different ways to create a tolerance analysis for a given capability

Required Tools

This course requires a small set of tools in lieu of a textbook. The tools can be acquired from any source and the links below are merely suggestions.

- 6" Calipers (digital or dial)
- Small needle nose pliers
- #2 Phillips screwdriver
- Small screwdriver set (flat and Philips)
- Black & Decker Lithium PivotDriver - Model Li2000

References

- BU CAD Resources Webpage: <http://people.bu.edu/pzink/creo.html>
- Machinery's Handbook from Industrial Press: Any edition from 24th to current
- PTC learning connector: <https://learningconnector.ptc.com/>

Class Structure

Approximately half of each class is dedicated to an overview of new topics; the other half consists of related self-paced student exercises which provide an opportunity for students to practice concepts in the presence of the instructor and BU Learning Assistants (LAs). ME359 Learning Assistants and a graduate student teachers host labs several times a week to provide CAD, homework and project help; all labs are in the CAD Lab at 110 Cummington Mall, room 302.

Grading

1. Homework, due by the beginning of each class day [70%] (weighted equally, lowest score dropped)
2. Midterm Exam [15%] (*There is no final exam in ME359)
3. Course Project: Disassemble a Black & Decker LI2000 Screwdriver; model, draw, and analyze the gearbox inside (based on level of effort and quality of deliverables), create a report in the form of design portfolio entry [10%]
4. Class Attendance, as evidenced by completion of in-class exercises [5%]

It is the students' responsibility to ensure that all grades have been recorded correctly on Blackboard. Any issues related to grading of homework, the exam or project must be reported to the instructor within one week after the grades are posted.

Academic Conduct

Students must follow the BU Academic Conduct Code:

<http://www.bu.edu/academics/files/2011/08/AcademicConductCode.pdf>

Violations will be reported to the College of Engineering Academic Conduct Committee.

Plagiarism is discussed in the conduct code, but deserves clarification specific to ME359 and CAD. Plagiarism is defined by Merriam- Webster as: "to steal and pass off (the ideas or words of another) as one's own", and is unacceptable in all cases. For example, handing in an edited copy of another students' CAD model, or a drawing derived from another students' model as one's own work is an example of plagiarism. Specifically:

1. In-class exercises: Designed and intended to be a collaborative effort; consultation with other students is encouraged. Each student must use their own computer for CAD and be able to demonstrate the ability to ultimately complete each exercise individually.
2. Homework and Course Project: Students may consult with each other regarding approaches to completing these assignments, however, all submitted work must be originally and uniquely authored by the student whose name appears on the assignment, and all sources must be referenced, including students consulted for any part of an assignment.
3. Exams: Each student must complete their exam individually with no consultation with anyone or any outside source other than the proctors.