

Engineering Design
COURSE SYLLABUS
INSTRUCTOR: Mr. Baker

CLASS LOCATION: Room 118
OFFICE HOURS: 8:00 - 4:00 Monday & Wednesday, Friday
OFFICE PHONE: 753-7377 Ext. 4300 HOME PHONE: 563-6689
E-MAIL ADDRESS: jbaker@intechchs.org
COURSE WEB PAGE: <http://www.intechengineering.org>

A. COURSE DESCRIPTION

This course is intended to introduce high school students to the engineering design process and the properties of good design. Students will plan, complete, and document a number of analysis-based designs. Skills will be developed in the creation of PERT charts, design reports, and technical drawings using computer aided design. The course content will be covered through a series of hands-on activities, use of an engineering notebook, and reports.

B. METHOD OF INSTRUCTION

This is a lecture-lab course in which topics are presented by the instructor. Assignments will be explained when assigned, and are to be completed during class time and outside of school as needed. Most of the course assignments will be completed on the computer using Autodesk Inventor and Microsoft Office applications. There will be a large end of course project that will account for 25 percent of the overall grade. There will be objective quizzes given randomly, and there is a comprehensive final exam.

C. COURSE OBJECTIVES/CORE STANDARDS

1. Recognition of the role of design in society

Students will...

- a. describe history of engineering design
- b. recognize and identify the role of engineering and engineered products in society
- c. identify the requirements for and role of intellectual property in design
- d. recall education requirements for professional success as a designer/engineer

2. Identification of the qualities of successful engineering design

Students will...

- a. be able to identify the qualities of good design and their relationship to the design's user
- b. be able to examine a design with respect to its quality and usability
- c. understand that these qualities are the result of choices made and constraints applied during the design process

3. Development of facility with the engineering design process

Students will...

- a. explain and perform the engineering design process
- b. be able to create design specifications considering such factors as time and financial resources, ergonomics, safety, and the state-of-of the art
- c. be able to locate and utilize a range of electronic, print, human information sources in the creation of a design
- d. utilize science and mathematics skills to generate multiple ideas for solving a design challenge and be able to critically evaluate those ideas
- e. be explain the role of and be able to utilize mathematical and functional modeling in the creation and assessment of a design
- f. be able to build and test their design against design specifications, evaluate the results of that testing, and present their analyses
- g. recognize and demonstrate that the design process does not result in a single best design, but instead there are many possible successful designs
- h. recognize and demonstrate that design is an iterative process, subject to continuous evolutionary improvement

4. Planning, documentation and communication of the engineering design process

Students will...

- a. develop plans for the completion of an engineering design
 - i. be able to develop a project charter
 - ii. identify the steps required for completion of a specific project
 - iii. be able to create a PERT chart
 - iv. define and identify the critical path in a PERT chart
- b. communicate and document engineering designs
 - i. prepare and maintain a design notebook
 - ii. communicate their progress to others with memo
 - iii. organize and prepare a design report
 - iv. be able to present their designs to others

5. The Use of Computer Aided Design Software

Students will...

- a. Drafting Fundamentals
 - i. demonstrate proper drawing layout by utilizing scales
 - ii. utilize line-types and line-weights properly on a drawing
 - iii. understand basic lettering techniques
- b. Dimensioning
 - i. understand basic dimensioning fundamentals
 - ii. demonstrate correct dimensioning techniques
 - iii. compare and contrast baseline dimensioning and continuous dimensioning
 - iv. discuss the importance of geometric dimensioning and tolerances

- c. Types of Drawings
 - i. illustrate orthographic projection drawings
 - ii. illustrate pictorial drawings
 - iii. illustrate section view drawings
 - iv. illustrate thread and fastener drawings
 - v. illustrate auxiliary view drawings
 - vi. illustrate revolution drawings
 - vii. create developments
 - viii. illustrate assembly drawings
- d. 3D Parametric Modeling
 - i. apply basic drafting fundamentals utilizing 3D modeling software
 - ii. utilize the 2D sketch tools
 - iii. utilize the extrude tools
 - iv. utilize the revolve tools
 - v. utilize the hole tools
 - vi. utilize the advanced 3D modeling tools
 - vii. utilize the 3D modification tools

Engineering Design Syllabus Affidavit

My signature below indicates that I have read and understand this syllabus and have been given instructions on where to locate additional copies online.

Student Printed Name

Student Signature

Parent Printed Name

Parent Signature

Please sign and return only this sheet to the instructor.