

# Introduction to Engineering: Syllabus

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## A. DESCRIPTION:

This half-year course provides students with hands-on activity- and problem-based experiences in the core engineering disciplines while practicing the engineering design process. Students will work as teams to complete projects while developing problem-solving skills as well as research methodology and engineering standards. Students will learn to document their work and communicate their solutions. Students will use 3D solid modeling software to compliment mechanical projects. This course aims to expose students to career possibilities in engineering and assumes no prior knowledge of the subject.

## A. COURSE OBJECTIVES

- a. Expose students to the variety of engineering disciplines, including mechanical, electrical, software, civil, etc.
- b. Use the Engineering Design Process to create engineering designs across the multiple disciplines.
- c. Explore current designs using Reverse Engineering.
- d. Use project-based learning techniques combined with hands-on materials and equipment to complete a variety of projects within the engineering disciplines

## B. COURSE TOPICS

- a. Engineering in History: research and discuss the impacts that various engineering achievements have had on today's society
- b. Investigate the various engineering disciplines
  - i. Discuss scientist vs. engineer
  - ii. Research the variety of job assignments, pay, schooling requirements in each discipline
- c. Engineering Design Process (EDP)
- d. Hands-on Projects to explore various disciplines including:
  - i. Mechanical Engineering: Puzzle Cube Team-based Project, including building the puzzle and creating 3D models and technical drawings in CAD software
  - ii. Software Engineering: Write code in Scratch to create an interactive greeting card and pong game.
  - iii. Electrical Engineering: Use bread boards to explore parallel vs. series circuits, mini-motors to drive a fan at different speeds, and make a circuit and write the binary code to correctly light up an 8-segment scoreboard display
  - iv. Civil Engineering: Use PVC pipe to design and build a water pump

## C. GRADING PLAN

Coursework will be weighted as follows:

- a. Class Work Assignments: 70%
- b. Quizzes, QOTD (Question of the Day), lab notebook: 15%
- c. Participation and behavior: 15%
- d. Midterm & Final Exam: 20% of semester grade

#### D. ATTENDANCE

See the Student and Parent Handbook for class attendance and tardiness. Remember that being late 3 times to class equals an unexcused absence and more than 6 unexcused absences mean an automatic course failure. Keep in mind that the majority of the grade is based on in-class work since Autodesk software is required.

#### E. CLASSROOM RULES OF CONDUCT

- a. Electronic device such as cell phones, iPods, mp3 players, and gaming devices must be turned off and out of sight in the classroom. If any such device is turned on or in-sight, this device will be confiscated. If it happens repeatedly a parent will be called to pick up the device from the office.
- b. Classroom computers may never be used for entertainment, including gaming and web surfing. These computers are for CAD and engineering purposes only.
- c. Classroom equipment and project supplies must be treated with respect and returned in the same condition as it was supplied when possible. If not, adequate after-school time or fees may be assessed.
- d. No food or drink permitted in the classroom. Only water is allowed if it is in a sports bottle (no screw-off or open tops).
- e. Always act and speak in an appropriate way. No bullying or swearing.
- f. Use class time for class work only. Remember: Time in class is invaluable. Don't waste it or we'll both have to stay after school to complete your work.