

# INTRO TO ENGINEERING AA

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## 1<sup>st</sup> Semester Overview

The REVERSE engineering semester

### 1<sup>st</sup> Quarter

- Paper & pencil sketching (2D and 3D.)
- Excel: spreadsheets, plotting, using equations, graphing, etc.
- Autodesk Inventor – computer aided design.
- Four Bike Lab team reports.
  - Bike Lab 1 – calculate of different materials, estimate bike frame weight.
  - Bike Lab 2 – bending beams, intro to stress and strain, use Excel to analyze data.
  - Bike Lab 3 – measure strain caused by sitting on the bike, use Excel to analyze data.
  - Bike Lab 4 – measure strain while riding the bike, use Excel to analyze data.

### 2<sup>nd</sup> Quarter

- More Autodesk Inventor.
- More Sketching.
- Five Camera Lab team reports.
  - Camera Lab 1 - take pictures to use throughout the quarter, inside & outside.
  - Camera Lab 2 - estimate & measure shutter speed and flash speed, take camera apart, see how shutter mechanism works, use an Oscilloscope.
  - Camera Lab 3 - study optics: focal length and depth of field, mathematically model focusing distances using excel, understand stereoscopic imagery.
  - Camera Lab 4 - learn terminology of electrical circuits and how they work, study the flash circuit using the Oscilloscope.
  - Camera Lab 5 - field trip to Ohio State University to see manufacturing and production management.

## 2<sup>nd</sup> SEMESTER Overview

- Teams give presentations on engineering disciplines (Mechanical, chemical, etc.)
- Teams design, analyze, and build roller coasters.
- Teams build complex speed trap circuits for their roller coasters.
- Teams give presentations about their roller coasters.
- More Sketching.
- More Autodesk Inventor.
- MATLAB (matrix laboratory software package.)

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**Syllabus** and selected course materials updated **online:**

<http://homelink.cps-k12.org/teachers/cotton/>

Help Nights scheduled as needed.

### Grades:

~ 40% - Exams

~ 30% - Group Lab Reports

*(Individual teammate scores subject to change based on attendance & discretion of the instructors.)*

~ 10% - Quizzes

~ 15% - Classwork & Homework

~ 5% - Portfolio

### Required Supplies:

- Pencils & Erasers.
- Calculator.
- 3-ring Binder(s) – see *portfolio requirements*

### Suggested:

- 6in ruler.
- USB Drive for saving work.