Welcome to ENGR 1182.03 Nano

ENGR 1182.03
Course Introduction Nano
Today’s Objectives

- Teaching Team Introduction
- Course Structure and Expectations
- Course Syllabus
- Graphics 01
  - Develop visualization skills using coded plans and snap cubes
  - Use coded plans to sketch objects in isometric view
- GP01 In-Class Activity
- GP01 Out-of-Class Assignment
Teaching Team Introduction

- Faculty Leader
- Graduate Teaching Associates - GTA
- Undergraduate Teaching Associates - UTA

Get to know us, we’re here to make you successful!
ENGR 1182.03 Course Structure

- 3 main subjects of ENGR 1182
  
  **Graphics**
  - Visualization Skills
  - Hand Sketching

  **SolidWorks**
  - 3D Computer Aided Drafting
  - Real World Application

  **Lab on a Chip (LOC)**
  - Team Engineering Design Project
  - Nanotechnology Project
  - Semester Long Project
  - Final Testing

Midterm 1: Weeks 1-5
Midterm 2: Weeks 2, 5-10
Final Documentation: Weeks 3-16
Structure & Expectations

The Flipped (or inverted) Classroom

- Students watch lectures/study materials online before class.
- Concept engagement takes place in the classroom with help of instructional team. (same as 1181)
**Learning Modules**

**Module Example**
*Session: Graphics 02*
*Quiz: GP02 (on Carmen)*
*Lecture: Graphics 02 (on Website)*

**Topics:**
- Isometric Sketching from Different View Points
- Inclined and Curved Surfaces in Isometric Sketching

**In-Class Activity: GP02_IN**
**Out-of-Class Assignment: GP02_OUT**
Required Materials

TEXT: Engineering Design (OSU Edition)
Local Bookstores

Drawing Packet: ENGR 1182.03
Course Packet
Barnes & Noble

In Class Activity
EED Courses Website

- [http://eedcourses.engineering.osu.edu/](http://eedcourses.engineering.osu.edu/)
  - Contains all ENGR 1182.03 course materials
  - Arranged by class meeting periods

- Navigate to website > ENGR 1182 Nano > Your schedule
  - Click on "Graphics 1"
# Website Organization

## Class 1 – Introduction to Engineering

<table>
<thead>
<tr>
<th>Assignment/Seminar Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assignments due at the beginning of class:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Things to do / read / study / learn before class:</strong></td>
<td>None</td>
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<tr>
<td><strong>In-class activities:</strong></td>
<td>1. Introduction to Engineering slides - <a href="#">Powerpoint</a> or <a href="#">PDF</a></td>
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<td></td>
<td>2. Introduce Instructional <a href="#">Staff</a></td>
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<td>3. Hand out and go over the Syllabus - <a href="#">PDF</a> or <a href="#">Word</a></td>
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<td>4. Show the video - Introduction to Engineering</td>
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<tr>
<td><strong>Assignments to be completed after class:</strong></td>
<td>Complete <a href="#">TeamMaker</a> by midnight</td>
</tr>
<tr>
<td><strong>Link to the next class:</strong></td>
<td><a href="#">Class 2 - Introduction to Problem Solving</a></td>
</tr>
<tr>
<td><strong>Link to the next lab:</strong></td>
<td><a href="#">Lab 1 - Marble Delivery System Lab</a></td>
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Carmen

- Online tool for some course resources
  - Gradebook, quizzes, journals
  - [https://carmen.osu.edu](https://carmen.osu.edu)
  - Use OSU login
  - 24/7 access

- Communication tool between instructional staff and students
Syllabus Review

- Assignment Policy
- Makeup Exam Policy & Guidelines
- Attendance and Participation
- Assessment and Evaluation
- Grading
- Online Evaluation Tools
- Journals
- Team Evaluations
- Academic Misconduct

NOTE:
- A minimum grade of 50% is required in the following course components to receive a passing grade in this course
  - Class Activities
  - Lab Activities
  - Exams
Team Formation

- You will work in teams of four on many assignments during the semester.

- Teams are created using a Team-Maker tool.

- You should have received email with a link.

- This survey needs to be completed soon.
Getting Help

- UTA Tutoring
  - Available in the First-Year Engineering computer lab (HI 324)
  - Staffed Mon-Thurs 9-7, Fridays 9-3

- GTA
  - Make an appointment or stop by during office hours

- Instructor
  - Make an appointment or stop by office hours.
Nanotechnology Design-Build Project

- Lab-on-a-Chip
  - Design
  - Document
  - Build
  - Test
  - Report
  - Present
Nanotechnology is cool!
1. Red Blood Cells
They look like little cinnamon candies here, but they're actually the most common type of blood cell in the human body - red blood cells (RBCs). These biconcave-shaped cells have the tall task of carrying oxygen to our entire body; in women there are about 4 to 5 million RBCs per micro liter (cubic millimeter) of blood and about 5 to 6 million in men. People who live at higher altitudes have even more RBCs because of the low oxygen levels in their environment.
3. Neurons
Of the **100 billion neurons** in your brain. Purkinje (pronounced purr-kin-jee) neurons are some of the largest. Among other things, these cells are the masters of motor coordination in the cerebellar cortex. Toxic exposure such as alcohol and lithium, autoimmune diseases, genetic mutations including autism and neurodegenerative diseases can negatively affect human Purkinje cells.
4. Hair Cells
Here's what it looks like to see a close-up of human hair cell stereo cilia inside the ear. These detect mechanical movement in response to sound vibrations.
The picture shows a single hydrogen atom being removed from a 10 nanometer wide titanium oxide surface, using a beam of electrons from an atomically sharp tip. The alternating ridges and grooves in the surface correspond to rows of titanium and oxygen, respectively. The white dimples, which straddle the grooves, are hydrogen atoms attached to the oxygen rows. There are no hydrogen atoms on the right-hand side of the surface because they have been removed, atom-by-atom, by the electron beam from the tip. 2006
5. Blood Vessels Emerging in the Optic Nerve
In this image, stained retinal blood vessels are shown to emerge from the black-colored optic disc. The optic disc is a blind spot because no light receptor cells are present in this area of the retina where the optic nerve and retinal blood vessels leave the back of the eye.
6. Taste Bud
This color-enhanced image depicts a taste bud on the tongue. The human tongue has about 10,000 taste buds that are involved with detecting salty, sour, bitter, sweet and savory taste perceptions.
7. Tooth Plaque
Brush your teeth often, because this is what the surface of a tooth with plaque looks like.
8. Blood Clot
Remember the red blood cells? Here's those same blood cells in the sticky web of a blood clot. The cell in the middle is a white blood cell.
9. Alveoli in the Lung
This is color-enhanced image of the inner surface of your lungs. The hollow cavities are alveoli – is where oxygen exchange with the blood occurs.
Isometric Sketching and Coded Plans

ENGR 1182
Graphics 01
Today’s Objectives

- Basic Isometric Sketching
  - Develop visualization skills using coded plans and snap cubes
  - Use coded plans to sketch objects in isometric view
- GP01 In-Class Activity
- GP01 Out-of-Class Assignment
Isometric Sketches

Isometric sketches represent 3D objects in 2D space. They are made as if you are looking down the diagonal of a cube. Shapes and angles are distorted equally in isometric view.
Coded Plans

Coded plans define simple objects which can be made from blocks.

Each number represents how tall the stack of blocks is at that location.
Isometric Sketches from Coded Plans

- Lines are only shown where surfaces intersect.
- Hidden edges are not shown in isometric view.
In-Class Activity (GP01)

DRAW AN ISOMETRIC SKETCH OF EACH OBJECT AS DEFINED BY ITS CODED PLAN
Important Takeaways

- 3D objects can be represented in 2D by sketching in isometric view.
- Coded plans are a blueprint for drawing simple objects.
- Lines are drawn only where surfaces intersect, and hidden features are not shown.
What’s Next?

- Due Next Class: GP01 Out-of-Class
- Isometric Sketching From Different View Points
  - Drawing objects from different views in isometric
- Inclined Planes and Curved Surfaces in Isometric
  - Adding new details to isometric sketches
  - Understanding how inclined planes and curved surfaces appear in isometric
- Take Graphics 2 Quiz on readings