Welcome to ENGR 1182.03 Nano

ENGR 1182.03
Course Introduction Nano
Today’s Objectives

- Teaching Team Introduction
- Course Structure & 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

Before Class
Reading Material
Carmen Quiz
Preparation

In Class Activity
Graphs 02

Out of Class Assignment
Practice and Assessment
Required Materials

TEXT: Engineering Design (OSU Edition) Local Bookstores

Drawing Packet: ENGR 1182.03 Course Packet UNIPRINT

Reading Material

In Class Activity
EEIC Courses Website

- [http://eeiccourses.engineering.osu.edu/](http://eeiccourses.engineering.osu.edu/)
  - Contains all ENGR 1181 course materials
  - Arranged by class meeting periods

- Navigate to website > 1182nano > Your schedule # or professor and time
  - Find **Class 1**
Website Organization

Class 1 – Introduction to Engineering

| Assignments due at the beginning of class: | None |
| Things to do / read / study / learn before class: | None |
| **In-class activities:** | |
| 1. Introduction to Engineering slides - [Powerpoint](#) or [PDF](#) | |
| 2. Introduce Instructional Staff | |
| 3. Hand out and go over the Syllabus - [PDF](#) or [Word](#) | |
| 4. Show the video - Introduction to Engineering | |
| **Assignments to be completed after class:** | Complete [TeamMaker](#) by midnight |
| **Link to the next class:** | [Class 2 - Introduction to Problem Solving](#) |
| **Link to the next lab:** | [Lab 1 - Marble Delivery System Lab](#) |
Carmen

- Online tool for some course resources
  - Gradebook, quizzes, journals
  - 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.
Methods of Getting Help

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

- GTA
  - Make an appointment or stop by office hours, they’ll appreciate it!

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

- Lab-on-a-Chip
  - Design
  - Documentation
  - Building
  - Testing
  - Report
  - Presentation
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.
2. Split End of Human Hair
Regular trimmings to your hair and good conditioner should help to prevent this unsightly picture of a split end of a human hair.
3. Purkinje 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 Cell in the Ear

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 depicts a single hydrogen atom being removed from a 10 nanometre 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 already been removed, atom-by-atom, via the electron beams from the tip. 2006
5. Blood Vessels Emerging from 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. Tongue with 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 a form of plaque looks like.
8. Blood Clot

Remember that picture of the nice, uniform shapes of red blood cells you just looked at? Well, here's what it looks like when those same cells get caught up 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 what a colour-enhanced image of the inner surface of your lung looks like. The hollow cavities are alveoli; this is where gas exchange occurs with the blood.
10. Lung Cancer Cells

This image of warped lung cancer cells is in stark contrast to the healthy lung in the previous picture.
11. Villi of Small Intestine
Villi in the small intestine increase the surface area of the gut, which helps in the absorption of food. Look closely and you will see some food stuck in one of the crevices.
12. Human Egg with Coronal Cells

This image is of a purple, colour-enhanced human egg sitting on a pin. The egg is coated with the zona pellicuda, a glycoprotein that protects the egg but also helps to trap and bind sperm. Two coronal cells are attached to the zona pellicuda.
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)

Example:

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

The Ohio State University First Year Engineering
Dwg. Title: [Blank]
Scale: [Blank]
Inst.: [Blank]
Units: [Blank]
Dwg. No.: [Blank]

Drawn By: [Blank]
Hour: [Blank]
Seat: [Blank]
Date: [Blank]
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