

WE're in Motion 2019

Engineering Lab Activities

Bioelectricity- a Natural Charge

Some tissues and organs have an electric field that can be easily measured. We will discuss the origins and measure this phenomenon in multiple tissues.

Beneficial to: Biomedical, Chemical, & Exploration Engineering majors

Location: Institute Hall, INS Room 3170

Conducted by: Dr. Jennifer Bailey, Professor of Biomedical Engineering

Build a Sound Indicator

NOTE: Will take part over two lab sessions

You will be given a printed circuit board, discrete circuit components such as resistors, capacitors, transistors, light-emitting diodes (LED: indicator lamps), a potentiometer and a microphone to build an LED sound-to-light device. A 9-Volt battery will be provided to power the circuit. Solder the components on the circuit board. Applications of device include: Sound Indicator, Simple Sound-to-light unit to music for the hearing impaired or Indicator for the phone, doorbell, and barking dog.

Beneficial to: All Engineering Majors and anyone interested in circuitry

Location: Electrical Engineering Lab: GLE Room 3280

Conducted by: WIM19 EE Mentors; Ken Snyder, Electrical Engineering Facilities Manager; and Students

Design to Manufacturing

This session gives you the experience to use and see the design process from conception to a final product. You will use CREO, a 3-D package, to work on a design, after which you will tour and see equipment that could produce the product utilizing various manufacturing processes. Highlights will include: a Computer Numerically Controlled (CNC) Machine, 3-D printer, and cutting material using high pressure water and additive manufacturing processes. Sample parts and process demonstrations will be available.

Beneficial to: Mechanical Eng., Industrial Eng., Computer Eng., and Engineering Exploration

Location: ME Computer Lab: GLE Room 2260 and Brinkman Lab: GLE Room 2410

Conducted by: Dr. Marca Lam, Mechanical Engineering Professor; and Rob Kraynik, ISE Staff

Electricity and Chemical Reactions from Smartphone batteries to jewelry

Explore concepts of electrochemistry through designing an electrochemistry experiment, assembling an electrochemical cell and carrying out tests on water electrolysis. Electrochemical reactions are used to obtain energy for all sorts of devices - from the human body to a smartphone. They are also used to fabricate metal-layered materials - from computer chips to jewelry.

Beneficial to: Biomedical and Chemical Engineering majors

Location: Institute Hall, INS Room 2162

Conducted by: Dr. Patricia Taboada-Serrano, Chemical Engineering Professor; and Students

WE're in Motion 2019

Engineering Lab Activities

Engineering, the Reason Behind the Design

Every object or device created by humans tells a story of more engineering decisions than you might think. There is a reason behind every feature of every object, from your smart phone, to the chair you're sitting in, to your water bottle. Most people know that engineers design things – but what does that really mean? Explore real world examples of what engineers actually do with hands-on reverse engineering of some common items. See how text book concepts turn into actual product design decisions. Leave the session thinking “like an engineer,” and understand how engineering connects to the world around you.

Beneficial to: Mechanical Engineering, Engineering Exploration, Industrial and Systems Engineering, anyone interested in the design process

Location: GLE 2139

Conducted by: Alan Metelsky, Adjunct Faculty, Dept. of Mechanical Engineering

Explore Engine Design

Learn about engines within cars, trucks, helicopters, and more! The session includes some talking, time to explore hands-on engine components, and an overview of student club activities on campus focused on automotive applications.

Beneficial to: All Engineering Majors and anyone interested in math

Location: GLE 2149

Conducted by: Dr. Margaret Bailey, ME Professor and Students involved with Formula/Mini-Baja/Hot Wheelz

Introduction to the Machine Shop

New to operating heavy machinery? This is your chance to explore basic turning operations on the lathe as well as basic facing operations on the mill. The lab begins with a safety overview and machine demo, followed by an opportunity to test operate both the lathe and mill.

Beneficial to: Mechanical Eng., Engineering Exploration, Industrial and Systems Engineering, anyone interested in machining capabilities

Location: Mechanical Engineering Machine Shop: GLE Room 2360

Conducted by: Jan Maneti, ME Operations Manager and Machine Shop staff

Introduction to and Tour of the Microelectronic Engineering Cleanroom

Be introduced to the concept of controlled manufacturing environments and the need to pay attention to “invisible” particles when building microelectronics or working in nanotechnology. Get to “gown-up” and enter the cleanroom for a tour and use a microscope to see an Integrated Circuit at each stage of its build, as well as, use a laser scattering instrument to “see” the invisible air-borne dust that can ruin your device. Gain an understanding of the Microelectronic Engineering field and an awareness of the career opportunities it offers.

Beneficial to: All Engineering Disciplines

Location: MicroE Cleanroom Lab: ENG Rooms 2510 and 2700

Conducted by: Dr. Mike Jackson, MicroE Professor; Dr. Rob Pearson, Director MicroE Program and Professor, and MicroE Grad Students

WE're in Motion 2019

Engineering Lab Activities

Manipulating Surface Tension through Chemical Engineering

The boundary between air and liquid has properties that can be controlled and manipulated by chemical engineers. You will learn about the origin of surface tension at air-liquid boundaries, as well as, how to manipulate surface tension to rupture films and move objects. In teams, design and build small boats powered solely by surface tension invoked by manipulating the chemistry of air-liquid interfaces.

Beneficial to: Chemical Eng., Biomedical Eng. and Engineering Exploration
Location: Unit Ops Lab: INS Room 2170
Conducted by: Dr. Ken Ruschak, Research Professor

Moving Fluid and Particles with Electricity

You will work with microfluidic devices and learn how electrical forces in the microscale can be used to pump liquid through a microchannel and also to move and concentrate microparticles. By applying an electric potential you will be able to observe liquid and particle movement inside a microchannel employing a microscope.

Beneficial to: All Engineering Majors
Location: Institute Hall, INS Room 3182
Conducted by: Dr. Blanca H. Lapizco-Encinas, Biomedical Engineering Professor and Students

So You Think Computers Can Draw?

Learn how to use the Turtle drawing tool in the Python programming language. Write your own code to create an artistic masterpiece. Run your program and watch the drawing tool make your code come to life. In addition to introducing basic programming language concepts, you will learn to debug your program and make adjustments accordingly. Prizes for the best drawings!

Beneficial to: All Engineering Majors
Location: Harris Computer Engineering Lab: GLE Room 3410
Conducted By: Dr. Ray Ptucha, Computer Engineering Professor; Dr. Sonia Lopez Alarcon, Comp. Eng. Professor; Mr. Lou Beato, Comp. Eng. Lecturer, Comp. Eng. Professor; and Students

So You Think Robots Can Dance?

Experience how to control differential drive robots. Write your own Arduino code to teach your robot how to dance to your own music. In addition to introducing basic programming language concepts, you will learn to debug your program and make adjustments accordingly. Prizes for the best dance routines!

Beneficial to: All Engineering Majors
Location: Harris Computer Engineering Lab: GLE Room 3410
Conducted By: Dr. Ray Ptucha, Computer Engineering Professor; Dr. Sonia Lopez Alarcon, Comp. Eng. Professor; Mr. Lou Beato, Comp. Eng. Lecturer; and Students

WE're in Motion 2019

Engineering Lab Activities

Tour Walt Disney World Without the Lines

Think you know how best to navigate a theme park? Think again. You will work with real life touring plan software to learn about the fascinating field of Operations Research, a field that quietly impacts every aspect of your life from planning a day on vacation to getting the mail on time. Compete against your friends and the software to find the fastest way to experience all your desired attractions. Explore how adding constraints and changing your objective affect your plan. Walk away from the session with customized optimal touring plan for your perfect day at Disney.

Beneficial to: Industrial Engineering, All Engineering Majors
Location: Industrial Engineering Computer Lab: GLE Room 1550
Conducted by: Dr. Katie McConky, Industrial Engineering Professor

Tribology Lab: Friction & Wear of Materials

No human activity could be conducted without the expenditure of energy. The machines and devices that we use need energy to operate, and part of this energy is wasted through friction in the moving parts of mechanical and electromechanical components. Friction, wear, and lubrication in engineering systems have a major influence on the economy of a country. In this laboratory, students will be introduced to the concept of friction and wear with several hands-on experiences. In addition, different methods to reduce friction and wear in machine elements will be briefly discussed.

Beneficial to: Mechanical, Chemical & Electrical Engineering Majors
Location: Lab: GLE Room 2385
Conducted by: Dr. Patricia Iglesias Victoria, Mechanical Engineering Professor
Hong Guo, PhD Student in Mechanical Engineering