2020 USTEP Class Catalog

Class 1 (10:00 - 10:50)

Rapid Prototyping
Students will be presented with a design challenge and work in teams to brainstorm solutions, build a prototype, and test it by the end of the class.

Behind the Game
Ever wonder how your favorite baseball team picks their players? Take a look as we explore how data-driven decision making & sabermetrics have changed baseball and led teams, like the Washington Nationals, to the World Series!

How the Internet Works
Chances are you use the Internet daily, but have you ever stopped to wonder what goes on behind the "screens" to make it work? In this class we'll cover a broad overview of concepts that will give you a peek into the guts and protocols that make the Internet work for you! Expect to learn about different communication protocols and be ready to explain how the magic of the Internet works to your friends!

Biological Origami: Proteins and their Structure
Proteins are everywhere. Some break things down, while others build things up. Some protect us from getting sick, while others are the cause of disease. In this class, we'll take a deep dive into proteins to discover what enables them to be so diverse. The secret lies in how they're folded…

Gray's Anatomy: Be a Doctor for a Day
Did you watch an episode of Grey's Anatomy and wonder what it would be like to be a real doctor? Did you know that there is a textbook of human anatomy titled "Gray's Anatomy" that many students studied to become doctors? How would you like to experience the world of medicine and be a doctor for a day?
Come be a part of "Gray's Anatomy's" newest class of medical students and learn what it's like to be a doctor! We will explore case studies of patients from around the world, learning basic concepts of medicine and what it's like to be a doctor. You will play the role of medical students in a hospital with a mystery patient, and it's your responsibility to learn, diagnose, and propose a treatment for your patient. Being a doctor entails much more than diagnosing and treating, and you will get an enlightening glimpse into the world of medicine.
Are you ready to be a doctor for a day?

Cryptography: Unmasking the Secrets of Code Cracking!
Want to know how to send coded messages? Come learn about existing ciphers, how they have been used, and how to create your own!

Introductory Web Development (for artists and the non-artistic)
Want to showcase your photography, 3D printing, or other talents? This class will begin with an overview of how websites work, introduce what HTML and CSS are, then show students how to pull a github repository to begin making a static website from a template. If you don't know what any of those words mean, this is the right class for you!

Whodunit? A Murder Mystery: Forensics 101
There's been a murder! It's up to you to figure out whodunit. Using a variety of forensic techniques, students will have the hands-on opportunity to solve a mystery.

Memetics: The Science of Memes!
Do you love memes? Have you ever wanted to study memes, and understand how they spread across the internet?
In this class we'll explore how memes, genes and evolution are surprisingly connected. We'll look at the original definition of "meme", and explore what the important properties of memes are. We'll dissect popular memes to see what properties make them so infectious.

Making Waves – Fun with Fourier
Ever wonder how Shazam identifies songs, how image and audio files are built, or how audio equalizers can boost the bass or other frequencies in music? Back in 1807, Mr. Jean-Baptiste Joseph Fourier figured out that any signal can be filtered into a bunch of circular paths. Today, we see these "Fourier Series" used everywhere from audio and image processing to describing how heat flows through an object. They can even convert your signature into a formula! With animations and hands-on demos, this class will show you how Fourier Series work and how it's used in the real world without any crazy math getting in the way.

A Look into the Extracellular Matrix - the non-cellular structures of tissues
What keeps your cells in place in your body? Have you ever wondered why different types of tissues like skin or bone feel different? In this class we will be giving a crash course on the extracellular matrix - the part of the tissue that is outside the cells. You will build your own model of the extracellular matrix to explore its many functions, including how it determines whether tissues are stretchy or stiff and directs the activities of cells by building your own model of the ECM. We will also discuss how the extracellular matrix is used in modern medicine to repair or replace damaged organs.

Why is the AC Too Cold? Answers To Your Most Burning Questions about Thermal Comfort
Have you ever wondered how a building can stay at a cool 70 degrees when it's blazing hot outside, or how houses stay warm in the frigid winter? Modern building design has allowed people to keep indoor temperatures at the level they want with high accuracy. Come learn about how engineers keep buildings cool in summer and warm in winter, while exploring fun concepts in thermodynamics and heat transfer!

What's the Code? An Introduction to Making and Breaking Codes
Have you ever tried to make a secret message system that only your friends knew how to decode? Love solving puzzles or just really like math? In this class, we will cover the basics of cryptography, the science of making and breaking codes. Prepare the delve into the world of spies as you learn about Caesar Ciphers, one-time pads, and public key encryption, so put on your thinking-caps and spy disguises!

Medical Applications of CAD: Bioprinters
We will be using Autodesk Fusion 360 to teach a simple outlook on tissue engineering and utilizing 3D printing to solve medical mysteries such as transplants and tissue rehabilitation.

Crime and Chromatography

Was it Professor Plum in the library with the candlestick or was it Miss White in the kitchen with the knife? If only there was a way to know for certain.

Chromatography is a method for analyzing mixtures by separating them into the chemicals from which they are made. In criminal investigations, forensic scientists use chromatography to help determine who committed the crime. Chromatography can be used to identify DNA at a crime scene, chemical composition of ink, or even help identify the cause of death. In this class, we'll explore the basics of chromatography and its applications and then use what we've learned to solve a mystery.

A Colorful Introduction to Flight and Fluid Dynamics

Come work as an aerospace engineer for the day! In this course, we will analyze the flow of air over an airplane wing. We will begin with a brief overview of fluid mechanics concepts, including an interactive explanation of Bernoulli's principle. Using the same software that professional engineers use to study everything from airplanes to blood flow in a vein, we will then run a colorful simulation of airflow over the wing to visualize that our fluids theories are correct.

Board Game Designers' Coalition

Have you ever wondered how your favorite games are made? In this class, you will have the chance to design your own board game that you can then take home to play! This class embraces creativity, design, and critical thinking as you learn part of the game design process, which extends to video games, writing, and other forms of creative expression.

The Power of Polymers

Polymers are all around us! The plastic in your water bottle, the rubber in your sneakers… even the DNA in your cells is a polymer. Polymers are very big molecules made up of small units that link together to form many unique materials. In this class you will experiment with a unique type of polymer found in an everyday object: diapers! These polymers can form hydrogels (wet, squishy materials) that are particularly useful to engineers. Come learn more about how biomedical engineers harness the power of polymers to make hydrogels for medical applications.

Thank You for your interest in Society of Women Engineers (SWE)
University Student Taught Engineering Program (USTEP)