OSSM Summer Academy 2024 – Course Offerings

Session 1: July 14-19

Session 2: July 21-26

A Concise History of Science

Instructor: Monique Baxter

This course examines the roots of science from antiquity through the Scientific Revolution of the 17th century. Emphasis is placed on the development of major philosophies/theories, scientific advancements, and the individuals credited with establishing the historical foundations of science.

ACT/SAT/PSAT Math Strategies and Review

Instructor: Sara Bodenstein

ACT, SAT, and PSAT Math test practice and review including strategies for test-taking and goal-setting. Bring your Wi-Fi enabled laptop for daily Kahoot competitions.

Animal Anatomy and Adaptations

Instructor: Brent Richards

Some are hairy, some are scaly, some are slimy. Some have legs, some have wings, some have fins or tentacles. Some are as big as a building and some are too small to see without a microscope. Animals have conquered every possible habitat on earth and they make up a crucial part of the planet's ecosystem. But how did they get to be the way they are? How can they be so different from each other and yet share a common ancestor? We will get up close and personal with a few representatives of the animal kingdom and study them both inside and out.

Calculus: A Gentle and Intuitive Introduction

Instructor: Frank Wang

Dr. Wang takes a fun and lighthearted approach to the teaching of the "big concepts" of calculus. Each day of the week he wears a different hat and delivers an interactive lecture on a facet of calculus.

Cancer & Stem Cell Biology

Instructor: Theodore Mathuram

The course will encompass basic concepts of metabolism, Signaling pathways of Cancer and Stem Cell Biology and how they differ from Normal cells while touching base on current trends in Cancer and Stem cell Research. Key topics would include - Cancer pharmacology, Cancer Stem Cell Biology, CRISPR/Cas9 Targeting of Cancers. The course will give young students an idea on what it takes to find a Cure for Cancer (Bench to Bedside)!

Competitive Research

Instructor: Sharon Jorski

Competitive research will give you the edge as you prepare for Science Fair projects, National History Day projects, essay/scholarship competitions and the traditional research paper. This class will teach skills and strategies for finding, evaluating, and using information. The class will use both traditional and online tools as well as print and digital sources. A variety of research and information management skills will be covered including selecting a topic and creating a research strategy. An actual research paper will not be written.

Computer Science I

Instructor: Sean Jones

This course is for people with little to no programming experience who would like to learn to code or gain more programming experience.

Computer Science II

Instructor: Sean Jones

This course is for people with some programming experience who would like to improve their skills by overcoming various programming challenges.

Creative Problem Solving

Instructor: Sharon Jorski

Creative problem solving and critical thinking skills will be used individually and in groups to solve a variety of creative challenges including problems, puzzles, games, and riddles. Problems will be solved using non-math skills such as diagramming, brainstorming, information gathering, observation, and data analysis to encourage not only lateral and linear thinking but also left and right brain thinking. Students will develop their creative skills by expressing their ideas and their critical thinking skills by reasoning through logic, as well as skills that overlap the two categories.

CSI Past & Present

Instructor: Monique Baxter

Students in this course will examine several criminal cases throughout history. They will learn about the crime scene methodology used at the time, as well as the practices and modern technology being applied to these cases today.

Engineering Projects: Design and Build

Instructor: Ron Mashore

Concentrate on synergy through teamwork and group problem-solving of practical engineering-type problems. Participate in hands-on lab projects based upon practical applications of science, physics, assumptions, and judgment e.g., electromagnets, catapults, friction, and popsicle bridge. Develop teamwork and competitive skills with problem identification and solving.

Gentle Introduction to Micro/Nano Electronics (Session 2 only)

Instructor: Manisha Chakraburtty
Introductory hands-on microelectronics with Arduino.

Hands-on Digital Electronics using Raspberry Pi

Instructor: Bill Underwood
Students will learn the difference between a computer (such as the Raspberry Pi) and a controller (like the Arduino UNO). They will construct several electronic circuits and program the Raspberry Pi to collect and display data from sensors and to control external hardware. They will control LEDs, measure temperature and humidity, implement an ultrasonic distance sensor, and program an RFID card reader. Students will be given a USB flash drive with their code as well as sample code which they can modify as desired.

Hands-on Physics

Instructor: Bill Underwood
In a letter dated 5 February 1676, Sir Isaac Newton said "If I have seen further it is by standing upon the shoulders of Giants." The giants he was referring to included Archimedes, Pythagoras, Descartes, Kepler, Galileo, and many others. In this course students will perform hands-on laboratory experiments, along with class discussion and instructor presentation, to gain an understanding of Newtonian (classical) physics and the important ideas that pointed the way.

Intro to Trigonometry for ACT/SAT/PSAT

Instructor: Sara Bodenstein
An introduction to the basics of trigonometry useful for the ACT, SAT, or PSAT. This course will be most effective if you have had Algebra I and Geometry, but it is not required. Bring a Wi-Fi-enabled laptop for daily Kahoot competitions.

Robotics Engineering and Programming

Instructor: Sharon Jorski

In Robotics Engineering and Programming, students will build and program autonomous robots in teams of 203 throughout the duration of the class while continuously engineering their robots to improve them for new challenges. Students will learn about the engineering process and basic coding skills along the way.

Science of Information

Instructor: Sharon Jorski
Science of Information will explore the history of information beginning with the world's very first author. Students will learn about, create a copy of, and play the first game to have its instructions written in and deciphered from cuneiform; teach a game to think like a computer, learn about computer logic games and create a rudimentary computer.

The World Of Engineering: Fields And Careers

Instructor: Ron Mashore

This introduction to ENGINEERING will provide the students with helpful information to assist them in their EDUCATION and CAREER DECISIONS. This course will examine, study, and discuss various engineering fields and what Engineers do. Discuss job classifications and duties: e.g. Electricians, Mechanics, Technicians, Designers, Researchers, Engineers, Licensed Engineers. We will also discuss Career Options: Credentials, Choices, Success Factors, and Self-fulfillment.