



Carnegie Mellon University Gelfand Outreach Summer Classes

Classes were developed by Carnegie Mellon University Faculty and Staff

Classes are designed to be

**Rigorous ~ Educational ~ STEM Focused ~ Hands-on ~ Fun
Classes at CMU in Oakland, Grades K-8**

Registration begins on March 9, 2015

see www.cmu.edu/gelfand

July 6-10, (9am-noon)

Anatomy and Robotics

Here's a class for the aspiring physician, scientist or roboticist! Learn the anatomical concepts of the bones and muscles that make up the human arm. Dissect a chicken wing to see the components and how it functions. Discuss extension and flexion of the arm and how the elbow and wrist move. Diagram the muscles and bones and make life-sized models. Program a Hummingbird circuit board (created at Carnegie Mellon University and available at BirdBrain Technologies) and make your arm model come to life. Use servos, LEDs, and sensors as you apply robotic technology to make your anatomical model move in a very realistic way. When science meets technology you will be amazed --- we're not twisting your arm! Grades 5-7. Cost \$325



Green Engineering

How does a bike become a bike? Or a computer become a computer? What happens when we're done with them? We will explore where "stuff" comes from, and where "stuff" goes. Along the way, we'll see how green engineers involved in designing these products reduce the impact they have on the environment. Favorite activities in this class include taking apart objects such as radios and phones and building structures using newspapers. Grades 5-8. Cost \$300

July 13-17, (9am-noon)

Anatomy and Robotics

(see description above)

Beginning Alice Programming

Learn computer programming skills using Alice, a software program designed at Carnegie Mellon that you can download at home. Learn the steps needed to create a computer program as well as programming concepts such as loops and conditional statements. Create your own animated movies and video games! Prerequisites: some familiarity with using a mouse and Windows. Grades 3-4. Cost \$300

July 20-24, (9am-noon)

Science and Engineering Summer Sampler

This is a one-week course in which students will be introduced to Engineering and Science happening at Carnegie Mellon University. Faculty and staff in science, engineering and computer science will share their experiences and research with the students. Participants will complete activities that help them develop a broader understanding of what it means to work as a scientist or engineer and understand how to conduct research and how research is used by the engineers and scientists. Grades 3-5. Cost \$300

July 20-31, (9am-noon)

Science of Every Day Stuff

Did you ever wonder how soap gets your hands clean? How does a light bulb work, and how do new light bulb technologies save so much energy? Cars get us from place to place, but how does liquid gasoline make a car move? These scientific and engineering questions are around us all of the time, and in "Science of Every Day Stuff" we will take the time to answer them. Kids from K-2 will have the chance to learn at their skill level the chemistry, physics, thermodynamics and other engineering properties of phenomena all around them through lectures, experiments and design. This two-week course will excite kids about science and technology while teaching them how to investigate the world around them using the scientific method to develop new ideas and hypotheses. Help us produce the next generation of great scientists and engineers! Grades K-2. Cost \$450

July 27-31, (9am-noon)

Robotics Programming and Designing

This course is an introduction to robot-building and robot-programming. Using LEGO® pieces and the MIT Handy Board, design and build desktop mobile robots, then program them using IC programming language to do dances, follow lines, and "sense" different objects in the environment. Will you be able to program your robot to bowl? Will your robot successfully be able to navigate through a maze without getting stuck? This is a team-based, hands-on course. No experience in robotics is required. Grades 6-8. Cost \$325

