Amplify Your Creativity

Ever wonder how to turn one good idea into a hundred possibilities? When generating new ideas for products and services, most people rely on brainstorming alone. Brainstorming is a good way to start, but there are other techniques that are much more fun and creative, and that greatly increase the quantity and quality of novel ideas. In this highly interactive session we’ll explore three additional techniques to generate ideas for an everyday medical device (stethoscope).

Biomechanics

Why do elderly people frequently fall and break their hips? Why are tennis rackets designed to have a “sweet spot?” Can a factory floor be redesigned to prevent fatigue in workers? All of these questions can be answered through biomechanics, the application of mechanical engineering principles to understand the motion of the human body. In this hands-on experience, students will design a prosthetic hand that performs everyday tasks such as shoelace tying and turning the pages in a book.

Biomedical Sensors and Instrumentation

Biomedical engineering is the application of engineering design principles to the fields of medicine and biology. Understanding anatomy and physiology is the key to the successful design of sensors and instrumentation used for health care diagnosis and preventative care. In this module, students will learn about cardiac electrophysiology and biomechanics of the human heart and build an electronic circuit to monitor heart rate using photoplethysmography (PPG), an optical technique used in wearable health monitors and fitness trackers.

Concrete Makeover

In this lab, you will test three different concrete specimens: one plain concrete and two concrete composites. We will demonstrate how composites can improve the properties of plain concrete. This is important in designing structurally sound buildings and transportation systems.

Mechatronics

Today’s engineers often need to understand how products’ mechanical designs, electrical circuits and programmed functions interact. The area of mechatronics is the study of this intersection. An example of this might be the Mars Rover, autonomous cars, prostheses or drones. In this experiential learning module, powered origami structures are constructed, which emphasize designing mechanical and electrical parts working together and incorporating creative or artistic flair.
Paper Recycling and the Environment

Engineers make everything from baby food to gasoline to paper! Learn about paper and the environment, then, try your hand at making recycled paper in this fun, hands-on module.

Product Development and Prototyping

There are many steps in the engineering design process between an idea and final product production. Prototyping is one critical step in the creative design process. Learn about the product development process and build your own functional electro-mechanical prototype.

Robots and Sensors

Robots need sensing capabilities to explore and understand their environment and to automate a given task. Robots are important to various tasks such as responding to a crisis situation or manufacturing products. In this session, students will build and program LEGO robots that use various sensors. The session also includes a tour of our robotics lab showing sensors applied to industrial robots.

Systems Engineering Approach - Cards to the Sky

Systems engineering helps to understand client needs to create successful systems. It considers the technical and business needs of customers to provide quality products that meet the needs of users. By using a systems engineering approach, cost and timelines of projects can be controlled while accounting for interfaces and requirement issues. In this lab session, students will apply systems engineering principles to optimize the construction of a portable tower.

Water for Life

Clean water is a fundamental need, yet over 750 million people do not have access to an improved water source. Water professionals around the world work to provide adequate sanitation facilities, source water protection and drinking water treatment in ways that can be economically managed by the local community. In this session, students will operate several water treatment methods that might be used in undeveloped regions. Compare “low tech” field tests with more advanced analysis currently used in U.S. treatment plants or research labs.