

**Incomplete Schedule!**  
**More classes will be added SOON!**

**SUMMER 2012**

The Marquette Engineering Outreach Program is excited to offer another season of workshops for K-12 students interested in learning about Engineering. The Office of Engineering Enrollment Management and Outreach seeks to enhance the mission of Marquette University and the College of Engineering by developing and preparing future Marquette engineers to be critical thinkers, problem solvers and leaders that will contribute to a global society.

To register for a Marquette Engineering Outreach Program, please visit:  
[http://www.marquette.edu/engineering/academies\\_register.shtml](http://www.marquette.edu/engineering/academies_register.shtml)

All engineering academies have limits on class size, and applicants will be enrolled on a first-come, first-served basis. Waiting lists are started once a class reaches capacity. Instructions for submitting payment are provided on the registration site.

For more about our programs, including current course availability, visit [www.marquette.edu/engineering/academies.shtml](http://www.marquette.edu/engineering/academies.shtml)

**June 18-19 (M/Tu)**  
**Soldering 101**

**Time: Noon-4pm**

**Entering Grades 8-12 \$95**

Soldering is a must-have skill for all sorts of electrical and electronic work. Soldering (pronounced "soddering") involves melting a material called solder with a heated hand tool called a soldering iron; the melted solder cools and forms a bond between two items. With the skills learned in this class, students will be able to set up their own electronic workshops and start building electronic kits on their own. *Soldering 101* will introduce students to basic electronic components such as resistors, capacitors, LEDs, switches, and the ubiquitous 555 timer integrated circuit (IC). These components will be soldered on a proto board and packaged to produce a system with a variable speed blinking light. Diagnostic instruments, including a DMM and oscilloscope, will be used to test and analyze the finished product. Basic soldering is a skill that is easy to learn and not too hard to master - it just takes practice!

**\*\*Register for Soldering 101 and The Finch and save \$20! \$170 for BOTH classes!\*\***

**June 20-21 (W/Th)**  
**The Finch Robot**

**Time: Noon-4pm**

**Entering Grades 8-12 \$95**

The Finch is a small robot used in Marquette's freshman engineering classes to introduce **computer engineering** to students with little to no programming experience. The Finch was developed by Carnegie Mellon University's CREATE Lab to allow students to *quickly and easily* start programming using a simple robotic platform and JAVA-based software environment. In this class, students will learn to modify pre-written programs to change the robot's operation using the JAVA programming language. Internal robotics components including motors, light sensors, infrared sensors, temperature sensors, accelerometers, and speakers will be investigated in detail. Marquette laptop computers will be used in this class. Students are welcome to bring and use their own laptops for controlling the Finch - assistance will be provided for installing the necessary JAVA and Finch software. More information about the Finch can be found at [www.finchrobot.com](http://www.finchrobot.com).



**June 25-27 (M-W)**  
**WeDo LEGO Robotics Workshop**

**Time: 9am-noon**

**Entering Grades 2-4 \$100**



Students can build animals, soccer players and more, and then add movement with fun, simple, drag-and-drop software created in LabVIEW. The LEGO Education WeDo platform redefines robotics for younger ages, making it possible for primary school students to build and program their own robotic solutions. In *WeDo LEGO Robotics*, students will build LEGO models featuring working motors and sensors; program their models; all while having fun developing their skills in science, technology, engineering, and mathematics. WeDo provides a fantastic hands-on learning experience that actively engages children's creative thinking, teamwork, and problem-solving skills.

**July 9-13 (M-F)**  
**Art for the Scientist**

**Time: 9am-noon**

**Entering Grades 2-5 \$170**

Many artists are inspired by science and technology to explore new forms of creative expression. *Art for the Scientist* will give students the opportunity to explore both sides of their brains. This class introduces **chemical engineering** by exploring many of the unique properties of polymers (plastics). Using a variety of materials, students will create polariscopes with polarized film, fanciful masks from milk jugs, colorful paintings with acrylics, toys made of recycled plastics, and pop-art dessert sculptures from polyurethane foam. All of the art-sci-tech projects are the student's to keep and take home...no artistic talent needed to participate!

**July 9-13 (M-F)**

**Time: 9am-noon**

**Animations with Alice**

**Entering Grades 5-8**

**\$170**

Alice is an innovative 3D computer programming environment that makes it easy to create an animation for telling a story, an interactive game, or video to share. Alice is designed to give students exposure to object-oriented programming. By manipulating the objects in their virtual world, students gain experience with all the programming constructs typically taught in an introductory **computer engineering** programming course. Students learn fundamental programming using 3D objects (e.g., people, animals, and vehicles) to populate a virtual world and create a program to animate the objects. Alice allows students to use drag and drop graphic tiles to create a program and then see how their animation runs, easily understanding the relationship between programming statements and behavior of objects in their animation. No prior programming experience is required to participate in this course. Learn more about Alice online at [www.alice.org](http://www.alice.org).

**July 9-13 (M-F)**

**Time: 1-4pm**

**NEW!**

**Water, Water, Everywhere!**

**Entering Grades 2-5**

**\$170**

Environmental engineers have very important jobs taking care of the planet and making sure we have access to safe drinking water. Sometimes accidents put our water resources in danger – for example, an oil spill can contaminate thousands of gallons of water people would have used for drinking. This class introduces students to **environmental engineering** using Engineering is Elementary curriculum. Science concepts related to the water cycle and ecosystems are reinforced as students learn about the importance of clean water. There will be an engineering challenge focused on designing a water filter while exploring a variety of filter materials, and a second challenge will have students designing a solution for cleaning an oil spill. Additional activities include testing plastic density and making a density tube to take home!

**July 9-13 (M-F)**

**Time: 1-4pm**

**3D Computer-Aided Design**

**Entering Grades 8-12**

**\$170**

Three dimensional computer-aided design (3D CAD) is an essential skill for engineers and designers working with product design and development in many applications, including automotive, shipbuilding, and aerospace industries, industrial and architectural design, prosthetics, and many more. CAD is also widely used to produce computer animation for special effects in movies, advertising and technical manuals. In this class, students will learn how to create their own 3D CAD models that convey not only design shapes but also information about materials, processes, dimensions, and tolerances. They will get to take one of their designs home when we print the model using Marquette's Rapid Prototype machine! The class will use Creo 1.0 software (formerly Pro/ENGINEER). Creo is just one of many CAD software packages used by high schools, colleges and universities, and businesses around the world.

**July 23-27 (M-F)**

**Time: 9am-noon**

**NEW!**

**Catching the Wind: Engineering Windmills and Parachutes**

**Entering Grades 2-5**

**\$170**

Students will become mechanical and aerospace engineers as they use their knowledge of wind and weather to design and create moving machines that can be used to capture wind, a renewable energy source. A variety of materials will be tested to make the best sails, and windmills will be engineered with blades strong enough to lift a load off the ground! On another day, students will explore and analyze data related to three variables of a parachute: suspension line length, canopy size, and canopy material in order to eventually complete their design challenge: creating a parachute that is "Mission Ready." This class introduces students to **mechanical and aerospace engineering** using Engineering is Elementary curriculum. Additional activities include soda straw rockets and Alka-Seltzer pop rockets to learn more about air and flight.

**July 23-27 (M-F)**

**Time: 1-4pm**

**The Sci-Lit-Math Bridge**

**Entering Grades 2-5**

**\$170**

Engineers don't just use math and science to solve problems; they need to be well rounded with good communication skills in addition to good calculation skills. *The Sci-Lit-Math Bridge* delivers science and math content through literature. The class will read short-stories introducing a number of **mechanical, environmental and chemical engineering** concepts before further exploration through hands-on activities. Students will investigate mechanical forces and motion using ramps, LEGO's cars, and Hot Wheel vehicles. Later in the week, students learn that chemical accidents have the ability to cause a lot of damage to our environment, and a study of various materials will help determine which are best to clean up an oil spill.

**Scientists investigate that which already is; Engineers create that which has never been.**

**- Albert Einstein**

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