



**MARQUETTE**  
UNIVERSITY

COLLEGE OF ENGINEERING

December 2009 – April 2010

**Engineering Academies for K-12 Students**

**MARQUETTE ENGINEERING OUTREACH**

*"Scientists investigate that which already is, engineers create that which has never been." Albert Einstein*

**12/28/09 10AM-3PM**

**"Introduction to Robotics with the LEGO Mindstorms NXT"**

**Ages 12-18**

**\$60**

Students will learn about the world of robotics through designing, building, and programming the LEGO NXT robot, the latest generation of Mindstorms. Students enrolled in this class could continue in the advanced division of the "Super SUMO-bot Competition with the Mindstorms NXT" the following 2 days.

**12/29-30/09 10AM-3PM NEW!**

**"Super SUMO-bot Competition with the Mindstorms NXT"**

**Ages 12-18**

**\$100**

Students will design, build and program robots to compete in a Sumo wrestling-style competition using the LEGO Mindstorms NXT system. There will be two divisions in the contest, one for beginners and one for advanced (those with NXT experience). Of course, we will have prizes for the best bots.

**12/29/09 9AM-4PM NEW!**

**"LabView for the FIRST Robotics Competition"**

**Ages 12-18**

**\$80**

This course will provide students with the basic knowledge needed to develop programs for the FRC competitions. The students attending will be asked to bring the cRIO and associated hardware from their respective teams. The course instruction will describe and illustrate the creation of simple programs applicable to the FRC robots. Through student exercises they will learn how to load the cRIO with their programs and to obtain robot status information from the cRIO for use in controlling a robot. Students completing this and the introduction course will have the basic knowledge needed to plan and develop their competition robot programs.

**1/16/10 10AM-3PM**

**"Electrical Engineering - A Shocking Experience!"**

**Ages 10-18**

**\$90**

If you can switch it on, chances are an electrical engineer was involved in making it. In this course students will learn how electricity is produced and how we control it in an electric circuit. They will also receive a multimeter (to take home!) and learn how to measure volts, amps, and ohms. Participants will build and take home working models of a household doorbell system, electromagnet, and a model electric car (value = \$30).

**2/6/10 10AM-3PM**

**"Engineering is a Family Affair"**

**Ages 6-12**

**\$90/pair**

No experience is needed for this program that teams a parent, grandparent or aunt/uncle and a child together to experience the fun, challenge, and excitement of engineering. Participants will perform hands-on problem solving activities, including LEGO drag races, flight of the air rockets, pasta bridge contest, fundamentals of electric circuits, and LEGO WeDo robotic animals. Included is an electric circuits kit (value = \$30) to continue experimenting at home.

**2/27 and 3/6/10 9AM-4PM**

**"Fun with 3D Computer-Aided-Design: An Introduction to Pro/ENGINEER"**

**Ages 12-18**

**\$150**

What do companies like Sony, Harley Davidson, Ferrari, and Dell have in common? They all use Pro/ENGINEER professional software to design everything from computers to cars to motorcycles. Over 2 Saturdays, students will learn how to build 3-D computer models as they design objects like airplanes and cars.

**3/6/10 10AM-3PM**

**"Civil Engineering – The Great Bridge Build"**

**Ages 8-16**

**\$90**

What student doesn't like building something and testing it until it breaks? In this course, students will learn the basics of bridge design through computer simulations. Then they will design and test the strength of the wooden trusses and bridges they build. They will also receive materials to continue bridge building at home (total materials valued at \$30).

**3/20/10 9AM-4PM NEW!**

**"Introduction to LabView"**

**Ages 12-18**

**\$80**

This course provides an introduction to LabView by National Instruments. LabView software is the foundation for programming LEGO Mindstorms robots, as well as designing electrical circuitry. Students will work in teams to develop simple LabView programs and use the Lego NXT and other hardware to test their results. An introduction to the use of LabView in the FIRST Technical Challenge and FIRST Robotics Competition will be described and illustrated.

3/27/10 10AM-3PM

**"Introduction to Robotics with the LEGO Mindstorms RCX"**

**Ages 7-12**

**\$60**

Students will be introduced to the world of robotics as they design, build, and program the LEGO RCX robot, the most popular educational robot in history. Students enrolled in this class could continue in the advanced division of the "Super SUMO-bot Competition, RCX" 4/5-9.

4/5-9/10 9AM-noon **NEW!**

**"Super SUMO-bot Competition, RCX"**

**Ages 8-16**

**\$150**

Students will design, build and program robots to compete in a Sumo wrestling-style competition using the LEGO Mindstorms RCX system. There will be two divisions in the contest, one for beginners and one for advanced (those with RCX experience). Did we mention there would be prizes for the best bots?

4/5-9/10 1-4PM

**"Engineering...It's A Girls Thing"**

**Ages 6-11**

**\$150**

Have you ever wondered how science and engineering helps protect us in a car crash? Have you ever built an air-powered rocket, an electric circuit, or a LEGO We-Do robot? Do you ever think how we could make the world a better place for all? If so, this course is for you. We will team girls of similar age into groups that will work cooperatively to experience the fun and excitement of engineering problem-solving activities. While most of our courses are co-ed, this one is for girls only!

4/5-9/10 1-4PM

**"Engineering for Young Women"**

**Ages 12-18**

**\$150**

Young women will work together to experience the fun, challenge, and excitement of engineering. Through hands-on activities, participants will learn how engineers work to solve the problems we face today, including the development of renewable energy resources and safer cars. Engineering will be presented as a positive force in improving our quality of life for all, i.e., the new "helping profession," and as a great career opportunity for young women. Sorry, no boys allowed!

4/17/10 9AM-4PM **NEW!**

**"Create Robotic Machines with 3-D CAD"**

**Ages 14-18**

**\$80**

3-Dimensional *Computer-Aided-Design* can be used to explore robotic machine ideas and see how the machines will move when built. In this course, ProENGINEER will be used to design robotic machines using LEGO Mindstorms and TETRIX parts. The assemblies will include moving connections so the parts of the robot can be moved and animated. Each student will use a ProENGINEER work station to carry out the design exercises and create their own robot design.

**\*All engineering academies have limits on class size, and applicants will be enrolled on a first-come, first-served basis. The age ranges for each course are recommendations only. Don't hesitate to enroll your son or daughter if they are a little older or younger than the ages listed.**

*The mission of the Engineering Outreach Program at Marquette University is to enhance the STEM (science, technology, engineering, math) skills of the children and adults in the M7 region, and better prepare them for the challenges of competing in a global economy driven by innovation.*

Outreach Team:	Dr. Jon Jensen, Associate Dean for Enrollment Management	414/288-6720
	Mr. Jack Samuelson, M.S., Coordinator of Engineering Outreach	engineering@marquette.edu
	Ms. Lori Stempski, Administrative Assistant	www.marquette.edu/engineering ("Current Events & Outreach")

**ENROLLMENT FORM**

Name: \_\_\_\_\_ Age: \_\_\_\_\_ Grade: \_\_\_\_\_ Gender: \_\_\_\_\_

Parent or Guardian: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ St: \_\_\_\_\_ Zip: \_\_\_\_\_

Email: \_\_\_\_\_

Course Title: \_\_\_\_\_ Date(s): \_\_\_\_\_ Cost: \_\_\_\_\_ One form per person for each course.

Please submit with your check, made out to "Marquette College of Engineering," and mail to:

Marquette College of Engineering  
Attn: Lori Stempski  
P.O. Box 1881  
Milwaukee, WI 53201-1881

"I agree to allow my child to participate in the Engineering Outreach Program at Marquette University. I assume responsibility for the actions of my child. I will talk to my child about the importance of good, safe, and cooperative behavior, as well as the virtues of being a good team player. Students who behave in an unsafe or uncooperative manner may be removed from the course without refund of fees. No refunds for missed classes. Students are enrolled on a first-come, first-served basis; once an academy is full, applicants will be placed on a waiting list. At times the media, instructors, or associates of Marquette University may choose to report on course activities. As part of these reports I will allow my son/daughter to be interviewed and/or photographed during supervised course activities."

Signature of parent/guardian: \_\_\_\_\_ Date: \_\_\_\_\_