



A 30-hour university-level course

10 Wednesday afternoon sessions

4:00 p.m.-7:00 p.m.

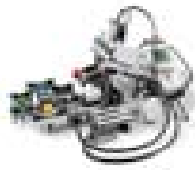
Meet 3 times per month on ACS Athens campus; once a month at AIT campus in state-of-the-art lab facilities.

Earn .5 ACS Athens graduation credit for successful course completion.

Cost: 500 euros (including materials)

To enroll: complete program application and return to Ms. Marietta Garbis (IIC Office) by January 20, 2012

"Innovation is creativity with a job to do."- John Emmerling



# INTRODUCTION TO ROBOTICS

A university course for high school students (10-12) who plan to pursue studies in science, technology, engineering or mathematics -- *and who are looking for a creative challenge.*

***Designed and taught by the faculty of Athens Information Technology for the students of ACS Athens.***

The course will teach students the basic principles of robotics and robotic design and challenge them to build their own special-purpose robots to compete in a “Robot Derby” at the end of the semester. Students will begin with the basics of modeling, design, planning, programming and control of robot systems. They will use their creativity and imagination to combine knowledge from geometry, physics, kinematics, statics, dynamics and computer programming to solve challenging and interesting engineering problems.

The course will be both theoretical and practical. During the theoretical strand, students will learn how transform all their knowledge into detailed plans to solve a problem and to implement them, i.e. devise and implement an algorithm – a skill of paramount importance in engineering. They will also learn design principles for building special-purpose robots: built for speed or light-weightedness, or to utilize sensors and display results, etc.

During the hands-on strand of the course, students will work a LEGO robotics platform and learn the tools to build and program LEGO robots. They will learn principles of programming and the NXT Lego programming tools. They will be exposed to many examples and many designs as well as how to utilize input from sensors.

As a final challenge, students will be organized into teams of 3 or 4 and be required to design, build and program a special-purpose robot for a specific task. A “robot derby” competition will be held at the end of the semester, in which teams will be assessed as to how successful they have been in creating and executing their design. Their performance will be measured according to specific criteria, such as task completion, speed, durability, and accuracy, among others.

This course is an adaptation of a corresponding first-year University course for 10th/11th/12th grade Academy students, who are serious about following a career in science and engineering. It will help them acquire basic programming skills and expose them to the multi-disciplinary way of thinking that characterizes today’s science and engineering. Students will draw on different areas of knowledge, such as geometry, physics, mathematics, programming, and efficient design, to successfully complete the course. Further, the exposure of the students to a challenging Technical University environment -- as well as the need to work in teams -- will open up new directions in their thinking about university education options and career paths.



# Course Schedule

Semester 2 (February 15 – June 2, 2012)

Wednesday February 15 (3 hours) : Course Overview, History of Robotics, Videos, Robotic Applications, Related Courses at AIT, Splitting into Working teams  
Wednesday February 22 (3 hours) Kinematics, Dynamics, Control, Forces, Units/Measuring  
Wednesday February 29 (3 hours) Angles, Rotations, Sensors & Sensor Readings\*  
Wednesday March 7 (3 hours) Designing Robots for a purpose, Intro to NXT Programming, The PC Tool, transferring code from PC to the Brick  
Wednesday March 14 (3 hours) NXT Programming: The Brick, the Tools Commands, Programming the BRICK, (Pseudo code, Visual environment, basic commands, state machines)  
Wednesday March 21 (3 hours) NXT Programming: The Brick, The Tools (Programmatic thinking, if, loops, infinite loops, functions)  
Wednesday March 28 (3 hours) Examples: Exploring Motions Exploring sensors, Exploring Display\*  
Wednesday April 4 (3 hours) Supervised term project work  
Easter Break  
Wednesday April 18 (3 hours) Supervised term project work  
Wednesday April 25 (3 hours) Supervised term project work  
Wednesday May 2 (3 hours) --- Presentation by students to their peers “Robot Derby”

\*Denotes class session at AIT campus. (Transportation will be provided.)

## ACS Athens...

*is a student-centered international school, embracing American educational philosophy, principles and values. Through excellence in teaching and diverse educational experiences, ACS Athens challenges all students to realize their unique potential: academically, intellectually, socially and ethically--to thrive as responsible global citizens.*

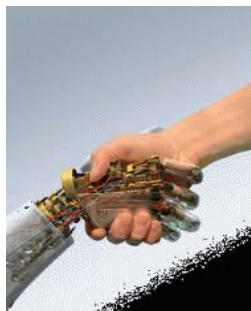
## Athens Information Technology (AIT)...

*AIT is a non-profit, independent technology institute that combines its talented faculty, industry links and partnerships to foster world-class education and advanced research in innovative technologies.*

*A faculty of internationally renowned professors - all graduates of top Universities in Greece, Europe or the USA with prior careers abroad and in Greece - creates an exceptional environment for technology research & education and ensures success in future academic or industry networking and placement.*

*AIT is affiliated with top Universities (Carnegie Mellon, Harvard, Aalborg) and provides educational opportunities that span the full range of information technology study starting from Accredited Undergraduate Program in Computer Engineering all the way to an accredited Ph.D. in Electrical & Computer Engineering, as well as 3 Master Programs with different emphasis and specializations. Our unique educational method of Problem Based Learning (PBL - supported by UNESCO) leading to hands-on problem solving, the integration of cutting-edge research into the curriculum, the dynamic curricula, our international student body, and the state-of-the-art facilities ensure success in academia and the market place.*

For further information please check our website <http://www.ait.gr>





# INTRODUCTION TO ROBOTICS

## APPLICATION

NAME:  
E-MAIL:

GRADE:  
PHONE:

CURRENT MATH COURSE:  
MATH TEACHER:  
TEACHER'S SIGNATURE (RECOMMENDING YOU FOR COURSE):

CURRENT SCIENCE COURSE:  
SCIENCE TEACHER:  
TEACHER'S SIGNATURE (RECOMMENDING YOU FOR COURSE):

PRINCIPAL'S RECOMMENDATION:

PARENT'S/GUARDIAN'S NAME:  
E-MAIL: PHONE:  
PARENT'S/GUARDIAN'S SIGNATURE:

*Parent's/Guardian's signature affirms that student has permission to participate in the program (including permission to travel to the AIT campus in Pallini once a month, and that parent/guardian accepts responsibility for course tuition, payable by February 5, 2012. Tuition is non-refundable once the course begins.*

ADDITIONAL STUDENT INFORMATION:

PROVIDE US WITH 5 WORDS THAT BEST DESCRIBE YOU AS A THINKER AND LEARNER:

- 1.
- 2.
- 3.
- 4.
- 5.

WHAT SKILLS/QUALITIES DO YOU POSSESS THAT MAKE YOU A VALUABLE MEMBER OF A TEAM OR WORKING GROUP?

WHY DO YOU WANT TO TAKE THIS COURSE?

**SUBMIT COMPLETED APPLICATION TO MS. MARIETTA GARBIS, IIC OFFICE IN THE ARTS CENTER AT ACS BY FRIDAY, FEBRUARY**