

**Intro to Engineering
Spring 2005
ROBOLAB Project**

Your team will construct a *Lego Robot* from the kits available from Dr. Lemley. The goal of the robot will be to program the robot using the ROBOLAB software to follow a colored line on the floor – the line will be made from a $\frac{3}{4}$ inch wide strip of colored electrical tape and you will **NOT** know the color of the tape prior to the contest. The robot will be timed in following the line (probably two attempts) and the robot with the shortest average time will win the contest.

You will need a **team leader** to set up times to work on the project and to assign tasks. So your first step will be to elect a team leader and to find a time to meet sometime after this Wednesday (31-MAR-05) and before the following Friday. The first meeting should include making plans for the robot (what wheels to use, how big, etc.) and how to use ROBOLAB. ROBOLAB is graphical software that may be used to create programs that control your Lego Robot. Dr. Lemley will provide a complete kit for you to use and a computer to learn to use the software. After the first meeting you should leave at least knowing the basics of programming the robot.

You will need to schedule subsequent meetings to finish your project. ENGR 1111 classes on April 5, 12, and 19 will be used to answer questions regarding your projects and allow your team additional meeting time. *You should not depend on class time to complete your project.*

The competition will be held on April 26, 2005 during class.

Presentations regarding your project and an assessment of what worked and did not work in your project will be given during the regularly scheduled time for the final which is 03-May-2005 from 11:00 a.m. - 12:50 p.m.

**Introduction to Engineering
Spring 2005
ROBOLab Project
The Rules and Information**

Rules:

1. Your final design requirements are that you may use the following:
 - a. One (1) RCX.
 - b. One (1) Light Sensor.
 - c. Two (2) Motors.
 - d. Any other standard pieces from the ROBOLab kits.
2. Use only your assigned ROBOLab kit. The kits will be initially labeled and on the rolling cart in Howell 110. Use your kit and when you are finished with it place it in a locked locker in the hallway outside room 110. You will be given a lock when you come in to work on your project.
3. You may scavenge from the cardboard box that contains extra Lego pieces. Do not scavenge from other kits or from kits that are not being used. If you identify missing pieces in your kit and are unable to find replacements, let Dr. Lemley know.
4. To perform certain tasks (e.g. watching the ROBOLab video) requires the ROBOLab installation CD. One CD should be present at the computer. Under no circumstances may you move or remove the CD. If you think you need to move or remove the CD ask Dr. Lemley.
5. The computer needs to be logged on as *Administrator* and Dr. Lemley is the only one who can do this, so do not log-off or reboot computers since Lemley may not always be available to reboot/log-in.
6. There are exactly enough new AA batteries for all the RCX's, but that is it. If there are already working batteries in your RCX use those first. Then each team may get up to six more AA batteries. If you need fresh batteries for the actual competition they will be provided, but to conserve batteries in the interim you should turn off the RCX whenever it is not being used and you should not make test runs too often.
7. When you are finished with a particular meeting save your programming files to the desktop of the machine you are using. You may also save to a floppy disk. This is a good idea since you may not be using the same computer the next time your team meets.

Meeting Ideas

1. Watch the RoboLAB video - there is a shortcut to the video on the desktop – and follow all steps in the video (Note the CD-ROM for RobOLAB must be in the computer you are using to watch the video... if the CD is not in the drive then go to the other computer and remove the CD, then take it to your computer).
2. Hook up the infrared transmitter to the computer and load the firmware on the RCX – the details on how to do this are given in Manual One.
3. Proceed with the programming examples in Manual One. Try to make it through the Pilot One and Two stages – at the moment there is only one set of manuals, so you may have to share with another group.
4. Look at the folder labeled *Documentation* to get ideas of how to construct mobile robots using wheels, gears, and treads.
5. Look on the web for other similar projects to get ideas.

**Introduction to Engineering
Spring 2005
ROBOLab Project
Sign-off Sheet
(Required for all members of all teams)**

I acknowledge that I have read and understand all of the rules on the **ROBOLab The Rules and Information** page and that I will leave all ROBOLab kit equipment and software in Howell 110 or in a locker in the hallway outside HH110 unless I have written permission from Dr. Lemley to remove it.

_____ Signature _____ Date

_____ Printed Name _____ ID Number