

Robotics - Syllabus

Teacher: Mr. Evans

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Webpage: www.scienceandmathacademy.com/academics/robotics/

Text: Cook, D., (2002). *Robot Building: for Beginners*. United States of America: Apress.

Course Description: This is a semester course which will teach the basics of robotics. Students will understand the design of a line-following robot and build it. Through the course, a basic understanding of DC circuitry will be covered. DC circuitry topics will include: power sources, resistors, LEDs, variable resistors, comparators, and motors. Students will learn how to use a multimeter, set a circuit up on a solderless breadboard, solder wiring and circuits, use small hand tools and power tools. Exposure to robotics in the real-world will be covered through selected readings and a field trip.

Course outline: The below outline is a loose guide.

- Day 1
 - Course Introduction
 - Chapter 1 – Welcome Robot Inventor!
 - Chapter 2 – Where to Obtain Tools and Parts
 - Homework: Read chapter 3 & 4
- Day 2
 - Chapter 3 – Safety
 - Chapter 4 – Digital Multimeter
 - Homework: Read chapters 5 & 6
- Day 3
 - Chapter 5 – Numbers and Units
 - Chapter 6 – Robot Line – Following
 - Homework: Read chapters 7 & 8
- Day 4
 - Chapter 7 - Nine-Volt Batteries
 - Chapter 8 – Clips and Test Leads
 - Homework: Read chapters 9
- Day 5
 - Chapter 9 – Resistors
 - Homework: Read chapters 10 & 11
- Days 6
 - Chapter 10 – LEDs
 - Chapter 11 – Power On! Building and Testing a Power Indicator Circuit
 - Homework: None
- Day 7
 - Review of the first 11 chapters
 - Homework: Study for test 1

- Day 8
 - Test 1
 - Homework: Read chapters 21 & 22
- Days 9 & 10
 - Chapter 21 – Soldering Equipment
 - Chapter 22 – Soldering and Connecting
 - Homework: None
- Days 11 & 12
 - Construct Crawling Microbug by Velleman
 - Test Microbug
 - Homework: Read chapter 12 & 13
- Days 13 & 14
 - Chapter 12 – Solderless Prototyping
 - Chapter 13 – Solderless Breadboard Setup
 - Homework: Read chapter 14
- Day 15 & 16
 - Chapter 14 – Variable Resistors
 - Homework: Read chapter 15
- Day 17 & 18
 - Chapter 15 – Comparators
 - Homework: Read chapter 16
- Day 19
 - Chapter 16 – Transistor Switches
 - Homework: Read chapter 17
- Day 20
 - Chapter 17 - DC Motors
 - Homework: Read chapter 18
- Day 21
 - Chapter 18 – Adding Gearhead Motors
 - Homework: Make a schematic for the circuit for the breadboard challenge
- Day 22
 - Breadboard circuit challenge
 - Homework: None
- Day 23
 - Review chapters 11 through 18
 - Homework: Study for test 2
- Day 24
 - Test 2
 - Homework: Read chapter 19 & 20
- Day 25 & 26
 - Chapter 19 – Wheels
 - Chapter 20 – Coupler
 - Homework: Read chapter 23
- Days 27 through 32
 - Chapter 23 – The Motherboard
 - Homework: Read chapter 24

- Days 33 through 35
 - Chapter 24 – Body Building
 - Homework: Read chapter 25
- Days 36 & 37
 - Chapter 25 – Launching the Line-Follower
 - Homework: Read chapter 26
- Days 38
 - Chapter 26 – Encore
- Day 39
 - Review chapter 19 through 26
 - Homework: Study for test 3
- Day 40
 - Test 3
 - Homework: None
- Other days
 - Fieldtrip to APG (tentatively September 6, 2006) (CNC machines, UAV's, etc.)
 - Extra days may be inserted from time to time.

Grading: All grades are determined by total points.

- **Tests:** 100 points each
- **Homework:** There will be discussions based on the readings. Your participation in those discussions will be worth 50 points.
- **Class work/Mini-Labs:** 10-25 points
- **Microbug:** 50 points
- **Robot:** 250 points (Further details of grading of the robot will be on a separate handout.)