School: Cornerstone Academy
Course Title: Electronics Technology and Robotics 1
Course Credit: ½ Credit Hours

Course Description: Electronics Technology and Robotics 1 provide students with the knowledge, hands-on experience, and technical skill to:

- Describe the structure of matter related to electronics.
- Construct, conduct, and analyze experiments with basic dc and ac circuits and with circuits using magnetism.
- Identify, measure, and describe the function of transformers and inductors in electronic circuits.
- Use Ohm's law and Watt's law to analyze and experiment with resistive circuits.
- Construct, analyze, and experiment with capacitive circuits.
- Demonstrate the proper use of electronic equipment.
- Demonstrate proper electronic assembly methods, including soldering and printed circuit boards.
- Demonstrate an understanding of basic electrical and electronic circuits.
- Demonstrate the ability to use and maintain basic electronic circuits.
- Demonstrate safe and appropriate use of tools, machinery, and materials in electronics technology.
- Fabricate a line following robot using a comparator, printed circuit board, and gearhead motors.

Second Year Course: See: http://cornerstonerobotics.org/curriculumyear2.php .
½ Credit given.

Third Year Course: Fall Semester **-** See: http://cornerstonerobotics.org/curriculumyear3.php
Spring Semester - Typically the MATE competition. See: http://www.materover.org/main/
If the team qualifies for the international competition, travel to any part of the United States or Canada would be necessary. We have qualified for past international competitions at St. Johns, Newfoundland, Canada (2007), Buzzards Bay, MA (2009), Houston, TX (2011), and Orlando, FL (2012). No credit given.

Fourth Year Course: Again, the MATE competition. No credit given.

The third and fourth year curriculums may not include competitions. If we do compete in MATE or other competitions, parental involvement to head the documentation phase is a must.

Course Requirements:

- Each student will be expected to participate in all four years of the program. This is necessary to ensure there will be enough students for a viable competitive team in the later years.
    - Year 1 & 2 class times: Typically, Monday 9:00 – 12:00 pm
      Longest class time: Monday 8:30 am – 12:30 pm
      ½ Credit Hour
    - Year 3 & 4 class times: Monday 3:00 - 6:30 pm
      Thursday 3:00 – 6:30 pm
      Extra time is typically needed as competitions approach. Some competitive dates are in late June and the competitive team works diligently until that June date.
      No Credit Hours
    - If a student foresees that there will be a time conflict with other activities during any of the years, they will have to decide to drop the conflicting activities or not participate in robotics. We are recruiting students who are committed to the program and who have a passion for the subject matter.

Guidelines:

- Students are expected to cooperate by displaying Christian standards of behavior and conversation.
- Discussions and conversations in the classroom are to encourage and buildup all participants. The atmosphere in the classroom must be one of mutual respect. Requests and instruction by the instructor should not have to be repeated.
- Since the students will be working with tools which can be dangerous, all students must be capable of acting in a mature and focused manner at all times in the shop and during instruction. We will provide a social time during a mid-class break.
- The instructor is working as a volunteer and may have to cancel classes from time to time.
- The parent must come to the shop to pick-up their student.

Lessons and Assignments:

- All lessons and assignments are available on-line at: http://www.cornerstonerobotics.org/curriculumyear1.php. If changes are made to a lesson, those changes are posted prior to the date the lesson is given.
- For logistical reasons, there are no makeup sessions for missed classes.

Tests and Quizzes:

- A take-home quiz is given almost every week.
- Quizzes are **not** open book unless expressly stated by the instructor.
- Quizzes are administered at home by the student's parents or guardians and returned the following class period.
- All late quizzes are assessed a ten percent (10%) penalty for every class period late.
- A test is given at the end of each grading period.

Grading:

- Quizzes and Labs: Equal weight

May 5, 2012

Dear Parents,

Electronics Technology and Robotics 1 will be offered for the 2012 – 2013 school year as a credited course. The class is open to Cornerstone Academy and home school students who attend the eighth and ninth grades. A list of pertinent items relating to the course follows:

- The class size will be limited to only six students.
- The course fee for the school year is $150.00 for students enrolled at Cornerstone Academy and $200.00 for home school students. The fee covers expenses which include:
    - Parts for Sandwich, the line following robot - $100.00.
    - Lab manual - $20.00
    - Shop supplies (fuses, broken jumpers, damaged parts, replacement blades and bits, etc.) - $20.00.
    - Shipping for all course materials - $10.00.
- A mathematics pretest will be administered prior to the first class. I strongly suggest that the student take the attached sample test and practice any area of weakness. The answers to the pretest are attached. The test provides the instructor the mathematics strengths and weaknesses of each student.
- The course will be held on Mondays, typically from 9:00 am until 12:00 pm.
- Lesson class notes are posted on the internet at: http://cornerstonerobotics.org/curriculumyear1.php
- Electronics Technology and Robotics 1 will not be taught again until the 2014 – 2015 school year.
- Parents or guardians must read and sign the Registration Form for their child to participate in the Cornerstone Electronics and Robotics program. Enrollment is first come, first serve.
- We will keep a waiting list in case we have a student drop out during or after the first year. If a student drops out, the new incoming student would have to take a mini-course in the summer of 2013 to catch up with the current class.

Cornerstone Academy Cougars
Electronics Technology & Robotics I Registration Form

(Please Print)
Student's Name: _____

Age: _____ Birthday: ____/____/____ Male/Female: _____ Grade Level: _____

Home Address: _____

Emergency Contact (Parent or Guardian): _____

Home Phone # ( ) _____Emergency Phone # ( ) _____

Cell Phone # ( ) _____Work Phone # ( ) _____

E-mail Address: _____

Physician: _____ Hospital Preference: _____

Make checks payable to Cornerstone Academy
Write Robotics in the comment area.

Cost:

- Cornerstone students - $150 for the year.
- Non-Cornerstone students - $200 for the year.
- All fees are non-refundable.

Cornerstone Academy admits students of any race, color, national and ethnic origin to all rights, privileges, programs and activities made available to students of the school. It does not discriminate on the basis of race, color, national and ethnic origin in the administration of its educational policies, admissions policies, financial assistance, athletics or any other school-administered programs.

Please Read Before Signing

I give my child permission to participate in Cornerstone Academy Electronics Technology and Robotics program. I agree to use my personal insurance if needed. I agree not to hold Cornerstone Academy and/or Mr. J_____ K_____ responsible for any injury or accident and authorize Mr. K____ to obtain medical care in the event of an injury or accident if a parent or guardian is unavailable to give permission. By the very nature of electronic and metal workshop activities, there is a risk of physical injury. The possible injuries include catastrophic injury, such as permanent paralysis and even death. The risk of physical injury can be minimized, but never eliminated.

This is a contract defining the terms of enrollment in this Electronics Technology and Robotics program between my family and Cornerstone Academy. This contract represents my commitment to the terms stated, and it is expected that my family and Cornerstone Academy will honor the terms of this contract. Cornerstone Academy reserves the right to add, change, limit, or cancel the event according to enrollment. I also give Cornerstone Academy permission to publish any photo that may be taken of me or my child for school use.

_____
Signature of Parent or Guardian **Date**

Sample Qualification Test for Electronics and Robotics Enrollment

Show your work for of the all questions.

1. Convert 7/8” to decimal form.

2. Express .17 as a common fraction.

3. Express 10^3 as a whole number.

4. What percent of 24 is 6?

5. What is 20% of 60?

6. Give the percent that each resistor contributes to the total as well as the total percent for all of the resistors. Take your answers to the tenth of a percent. (3 points)

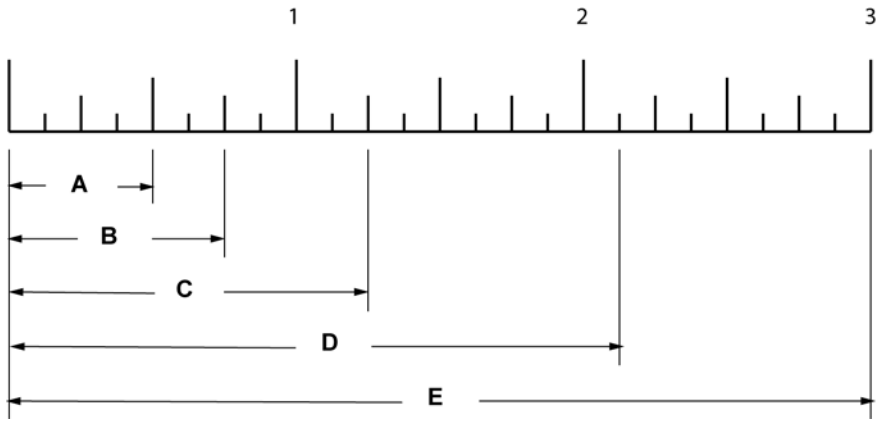
Resistor	Value in Ohms	%
1	56	
2	330	
3	470	
4	1000	
5	89	
Total:	1945	

7. If 1 inch equals 25.4 millimeters, express 2.3 inches as millimeters.

8. If V = I x R, (where V is in volts, I is in amperes, and R is in ohms), and I = 2.9 amperes and R = 78.5 ohms, solve for V.

9. If X = Z x T, solve for T.

10. Write the fraction or the mixed number that each length, A through E, represents. (5 points)



A = _____

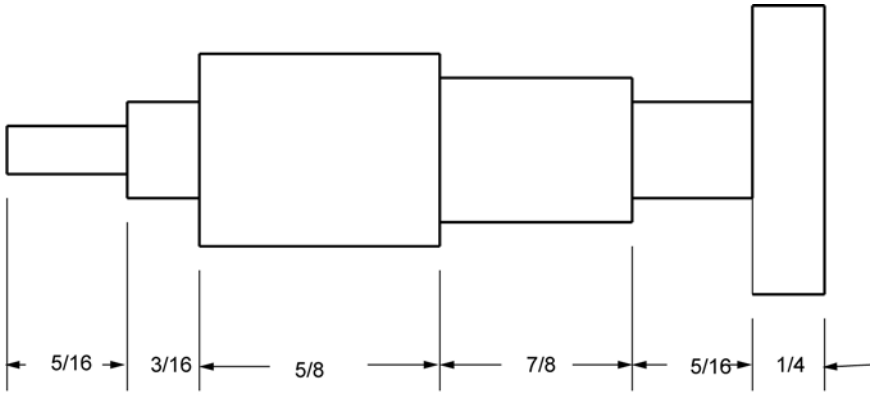
B = _____

C = _____

D = _____

E = _____

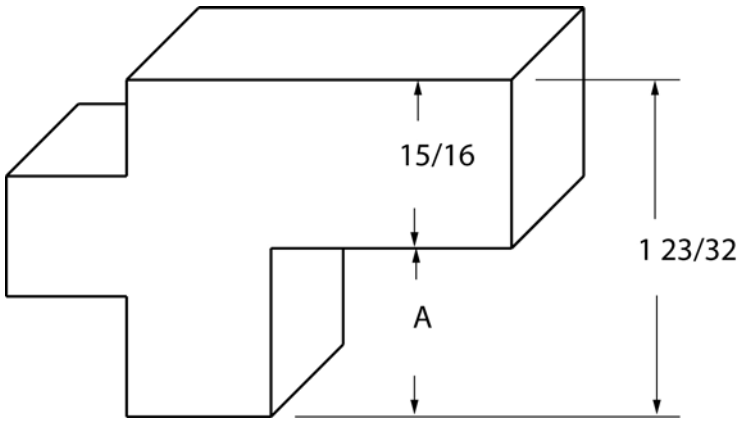
11. Determine the total length of the shaft. Give your answer as a mixed number.



NTS (Not To Scale)

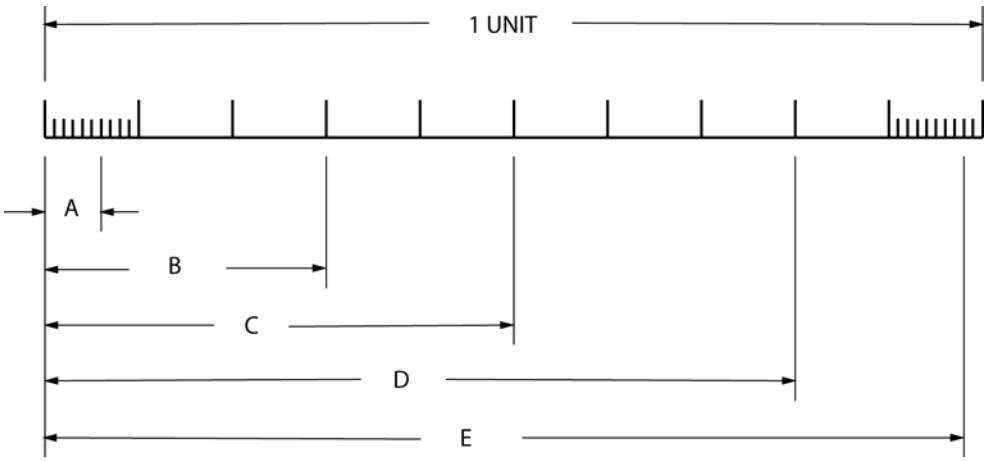
Shaft length = _____

12. Determine dimension A.



Dimension A = _____

13. Determine the decimal values of the distances A through E. (5 points)



A = _____

B = _____

C = _____

D = _____

E = _____

Answers to the Sample Qualification Test for Electronics and Robotics Enrollment

1. 0.875
2. 17/100
3. 1,000
4. 25%
5. 12
6.

Resistor	Value in Ohms	%
1	56	2.9%
2	330	17.0%
3	470	24.2%
4	1000	51.4%
5	89	4.6%
Total:	1945	100.0%

7. 58.4 mm
8. V = 228 volts
9. T = X/Z
10. A = ½
    B = ¾
    C = 1 ¼
    D = 2 1/8
    E = 3
11. 2 9/16
12. 25/32
13. A = .06
    B = .3
    C = .5
    D = .8
    E = .98