Robotics I
Course of Study

1. Introduce the field of engineering

2. Understand the design process

3. Introduce the construction of the VEX robot

4. Update a robot using IFI VEXnet Firmware

5. Introduce programming software- i.e. ensures motors and sensors are plugged in properly, IFI VEXnet Firmware upgrade

6. Introduce while loops and motion control, integers, parameters, debug window, conditional operations, for loops.

7. Introduce Easy C programming and SensorBot motion

8. Work as a productive member of a team to program robot to meet objectives of assigned projects

   i. Communicate clearly with team members
   ii. Listen to other team member's ideas
   iii. Cooperate with team members to successfully complete assignments
   iv. Show respect in all communication

9. Use the underlying math concepts when solving programming assignments

   a. Solve variables to complete lab assignments
   b. Demonstrate how to graph
   c. Interpret a graph
   d. Define slope
   e. Use math concepts by programming the robot to perform a task

10. Use engineering notation and prefix notation in engineering and robotics design

11. Direct current circuits including voltage, current and resistance

12. Develop the basics of base 2 and base 16 numbering systems
    a) Develop use of signed numbers and conversion between numbering systems;
        i. Base 10 to base 2
        ii. Base 2 to base 16

13. Utilize a Windows scientific calculator

14. Integrate acquired skills to successfully program a robot and solve the final problem statement
    a) Write a program using Easy C and download the program to the robot
    b) Convert a problem statement into a flowchart or similar design document
    c) Convert a flow chart into programming statements that solve the problem statement.
    d) Develop and discuss the nature and use of subroutines as logical entities in the control of a robot
    e) Discuss collision avoidance strategies
    f) Develop a program that integrates concepts which directs a robot to solve a given problem statement
    g) Program robot maneuvers using the C programming language
    h) Demonstrate good programming documentation
    i) Demonstrate the use of electronics (applicable formulas) to solve robotics related electrical problems
    j) Demonstrate the use of physics (applicable formulas) to solve robotics related physics problems for loop control
    k) Demonstrate robot maneuvers using conditional statements(if /else)
    l) Use sensors to detect objects/obstacles, measure distance, etc.
    m) Write a program instructing the robot to repeat a given command for a specified number of times using variables.
    n) Program the robot using conditional statements to operate the bumper.
    o) Program the wheel encoders by determining distance from wheel rotation.
    p) Re-program the remote control to do additional functions.
    q) Program the robot to use the line follower sensors.
    r) Use Easy C programming and printing variables on the screen
    s) Program an iteration statement
    t) Program a selector statement
    u) Program input and output ports
    v) Program LEDs and sound under program control

w) Develop programming motion
   i. Forward motion
   ii. Backward motion
   iii. Left and right 90° turns
   iv. Controlling LEDs
   v. Generating sound

x) Use logical operations and subroutines
   i. Create subroutines
   ii. Use subroutines

BRECKSVILLE-BROADVIEW HTS.
CITY SCHOOL DISTRICT

"where fine education is a heritage"

Curriculum Development Rubric

December 16, 2013	Required by statute and State Department of Education	Consistent with district philosphy	Intended program outcomes are appropriate	Allows for individual interest and talent	Curriculum and grade level articulation exists	Utilizes a variety of learning resources	Includes K-8 phonics instruction	Encourages academic and career planning	Meets material and resource requirements	Meets financial constraint requirements
Robotics 1		✓	✓	✓	✓	✓		✓	✓	No new staffing; may replace Woodworking