

BEST High School
Robotics TEC621
Justin ochsner
Competency-based Syllabus

Welcome to Robotics!

This semester, we will be focusing on computer science and programming. This CTE course is designed for high school students who are interested in learning about computer programming. Unlike traditional computer programming courses, this course uses small, personal robots to highlight programming concepts. This course has strong mathematical content presented in an engaging way for kids. Rich in STEM concepts, students use technology to support core academic subjects such as science and mathematics.

The Scribbler robot, moves, beeps, dances, senses light, avoids obstacles, and takes pictures with a built-in camera. The software is open source, and easy to learn. This year, we will also use the BoeBot Robotics Kit to expand our learning in electronics, mechanics, and programming. The main programming platform we will be using is Python, as it is a free source program. See the next page for information about the units we will be covering this semester.

Items You will need on a daily basis:

- **Pencils** (Pens are strongly discouraged)
- **A graphing calculator** (TI-83 or Ti-84. If you can't afford one, we have some you can borrow during class).

Instructor Info:
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Best High School
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Instructor's Note: I encourage you to seek out help from me during the school year. Not only during class, but also please feel free to arrange time to meet with me before and after school, and to always ask for help when needed.

We will be using the following website for much of our curriculum and resources in this class:

www.CTEwashington.net

Instructional Materials:

This course does not use a textbook. Projects and assignments are teacher-created or drawn from a variety of resources. Students need to bring paper and writing utensils to class. Students will need a scientific calculator. Classroom calculators are available for students who do not have their own.

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Semester 1:

Session 1 (9/6 – 10/4) – Computer Science as a career, speaking, writing programs, ASCII code writing, calibrating, moving.

Session 2 (10/5 – 11/4) – Making Music, variables, slope intercept

Session 3 (11/7 – 12/9) – Making the Robot dance to music, importing sound, taking pictures, programming graphics.

Session 4 (12/12 – 1/27) – Publishing Projects, If, Else commands, independent projects, portfolio completion.

Semester 2:

Session 5 (1/30 – 3/2) – Computer Science as a career, speaking, writing programs, ASCII code writing, calibrating, moving.

Session 6 (3/5 – 3/30) – Making Music, variables, slope intercept

Session 7 (4/9 – 5/11) – Making the Robot dance to music, importing sound, taking pictures, programming graphics

Session 8 (5/14 – 6/22) – Publishing Projects, If, Else commands, independent projects, portfolio completion.

All summative assessments are due by 1 pm two school days before the end of session

All coursework is aligned with the Washington State and District EALR's

Students earn credit for proficient completion of each session's summative assessment

Session	Learning Target	Formative	Summative
1 or 5	-Units 1-4; see details below.	- Independent assignments - Portfolio check	- Portfolio Completion
2 or 6	- Units 5, 6; see details below.	- Independent assignments - Portfolio Check	- Portfolio Completion
3 or 7	Units 6, 7, 8; see details below.	- Independent assignments - Portfolio Check	- Portfolio Completion
4 or 8	Units 9, 10; see details below.	- Independent assignments - Portfolio Check	- Portfolio Completion

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UNITS OF INSTRUCTION

- [Unit 1: Introduction to Computer Science](#)

Introduction to Computer Science Using Robots

- Why is computer science important?
 - What is a technology producer?
 - What does it take to be a computer programmer?
-

- [Unit 2: Robotics - Past and Present](#)

Our First Look at Robotics

- What is the difference between autonomous and remote controlled robots?
 - What are some different types of robots?
 - How are robots related to computers and computer programming?
-

- [Unit 3: Introductory Programming Techniques](#)

Learning to Speak to a Computer

- How to write a simple "Game Over!" program
 - How to identify and solve syntax errors
 - How to use strings
 - How to perform simple math
-

- [Unit 4: Robots - Calibration and Forward Movement](#)

Robots-Calibration and Forward Movement

- Who is myro?
 - How to care for your Scribbler
 - What is Pair Computing?
 - How to calibrate the Scribbler
 - How to make the Scribbler move
 - How to make music
 - How to use speech
-

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- [Unit 5: Variables and User Input](#)

Introduction to Variables

- string, integer, and float variables
 - asking for user input
 - prediction by use of slope intercept
-

- [Unit 6: Functioning on Your Own](#)

Stepping to Music

- Importing sound files
 - Controlling movement
 - Designing new functions to meet needs
 - Pair Computing - Dancing With The Bots
-

- [Unit 7: Take Pictures When You Travel](#)

Can You Hear Me Now?

- Calling Functions From Functions
 - Creating a main() Function
 - Robot Rectangles
 - Capturing Robot Images
 - Robot Remote Reporting
-

- [Unit 8: Getting Graphical](#)

Drawing on Windows

- Creating Windows
 - Drawing Points
 - Drawing Lines
 - Drawing Circles
 - Drawing Rectangles
 - Drawing Text
-

- [Unit 9: If, Else, For, and While](#)

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Making things loop

- If statements
 - For statements
 - While statements
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- [Unit 10: Publishing Your Scribbler Images](#)

Using the Camera and Create Web Pages

- Create simple web pages with images
- Create simple web pages with animated images

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Session Grading Policy

- This course is divided into **4** sessions.
- Completion of each session will earn **.125** credit.
- Grades that can be earned are: A, B, C, or NC.

Assessment for Learning

In this course, our main focus is for each student to understand the concepts of Geometry and be able to apply them to solve problems. In order to best promote and support students' learning, we are going to shift our assessment practices so students will have a clear understanding of what they are expected to know and be able to do. Students will be given many opportunities to practice these skills and work to master the content through classroom activities, homework, and penalty free quizzes before showing what they know on our summative tests. Students will frequently be asked to self-assess their understanding, and to work in pairs, small groups, or as a class to improve each others' comprehension.

Warm Ups/Class work/Homework

Students will be given warm ups, group work, class work, and homework assignments to practice their skills individually on a regular basis. These assignments are crucial for students to expand their understanding, and will give both the students and me an opportunity to check their comprehension of small chunks of material before moving on. It is very important that the students attempt and give serious thought to all problems, as our difficult content is best learned through this individual practice and sometimes struggle. Homework assignments will be discussed and checked the next day in class, giving students the opportunity to ask questions of each other and me to further increase their understanding.

Formative Quizzes

We will have short, penalty-free quizzes about once a week throughout the year. The sole purpose of these quizzes is for students to gauge their current understanding and correct misconceptions. These quizzes will not count as part of a student's grade, but will be used to determine which concepts each student needs to work with more to master.

Summative Assessments

100% of the students' grade is determined by the summative assessment. At the end of each session, we will have a summative assessment where students will be asked to show that they have learned the material, can perform necessary skills, and can apply concepts to solve problems. These assessments will be the great majority of students' grades each session. There may be a few projects or other classroom assignments where students will be asked to apply previous knowledge to real-life tasks or in-depth problems. These assignments may be part of the summative assessment, or may be formative only.

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Formative Assessments

Your formative assessment will be your ongoing demonstration of your ability to become proficient with the learning target for the session.

Formative Assessments:

- **Daily Concept Notes**
- **Daily Pair or Group Practice**
- **Daily Individual Practice**
- **Daily Homework**

Weekly Student Notebook Checks

Weekly Quizzes

End of session Review

Sample Classroom Day:

Small investigation – just try it!
Concept Instruction – take notes
Practice: Guided individual practice
 Pair or group practice
 Individual practice
Final Assessment – exit slip or final problem(s)
Small Homework Assignment due tomorrow

Summative Assessments

At the end of the session, students will choose a summative assessment option, and complete it. **This assessment will formally demonstrate whether the student is proficient with the learning target for the session.**

Examples of Summative assessment options used:

Portfolio Option (100% of grade)

Maintain a portfolio throughout the session, exhibiting student work, quizzes, and projects. Work will be kept in students' notebook, and projects/special assignments will be attached. The student will submit this prior to the end of the session, and the instructor will make recommendations for needed changes. The student will then re-submit in order to demonstrate proficiency of the standard. This includes a final assessment that can be re-taken.

Power point presentation (100% of grade)

Complete two extended problems as a PowerPoint, including necessary graphs, tables, pictures, equations, and statement of problem. Graphing calculator data will be uploaded to PowerPoint as part of the demonstration. Must present to class or instructor in a proficient manner.

One on one problem solving demonstration (100% of grade)

Complete two extended problems in presence of instructor, using oral and written methods to demonstrate mastery of standards.

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Types of Learning Activities

[This chart demonstrates the types of learning activities the student will complete throughout the course]

Direct Instruction	Indirect Instruction	Experiential Learning	Independent Study	Interactive Instruction
<input checked="" type="checkbox"/> Structured Overview <input checked="" type="checkbox"/> Mini presentation <input checked="" type="checkbox"/> Drill & Practice <input checked="" type="checkbox"/> Demonstrations <input type="checkbox"/> Other (List)	<input checked="" type="checkbox"/> Problem-based <input type="checkbox"/> Case Studies <input checked="" type="checkbox"/> Inquiry <input checked="" type="checkbox"/> Reflective Practice <input checked="" type="checkbox"/> Project <input checked="" type="checkbox"/> Paper <input type="checkbox"/> Concept Mapping <input type="checkbox"/> Other (List)	<input type="checkbox"/> Virt. Field Trip <input type="checkbox"/> Experiments <input checked="" type="checkbox"/> Simulations <input type="checkbox"/> Games <input type="checkbox"/> Field Observ. <input type="checkbox"/> Role-playing <input type="checkbox"/> Model Bldg. <input type="checkbox"/> Surveys <input type="checkbox"/> Other (List)	<input type="checkbox"/> Essays <input checked="" type="checkbox"/> Self-paced computer <input type="checkbox"/> Journals <input type="checkbox"/> Learning Logs <input checked="" type="checkbox"/> Reports <input type="checkbox"/> Directed Study <input checked="" type="checkbox"/> Research Projects <input type="checkbox"/> Other (List)	<input type="checkbox"/> Discussion <input type="checkbox"/> Debates <input type="checkbox"/> Role Playing <input type="checkbox"/> Panels <input type="checkbox"/> Peer Partner Learning <input type="checkbox"/> Project team <input type="checkbox"/> Laboratory Groups <input type="checkbox"/> Think, Pair, Share <input checked="" type="checkbox"/> Cooperative Learning <input type="checkbox"/> Tutorial Groups <input type="checkbox"/> Interviewing <input type="checkbox"/> Conferencing <input type="checkbox"/> Other (List)



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Justin's Expectations

- (1) **Respect:** At all times you are expected to be courteous to your teacher and classmates and to always be positive. This includes the language you use, but also the tone and intent of your words. You are also expected to be very quiet and respectful when the teacher or another student is trying to talk to the class. If the instructor makes a request of a student for the benefit of the learning environment, the student is expected to be cooperative. *All LWSD and school rules and consequences apply inside the classroom. Violations will result in meeting with the principal and/or immediate removal from class.* **Copying:** During a summative assessment, or completing individual work, copying another person's work is cheating, and will not be tolerated. Letting someone else copy your work is also cheating, and will not be tolerated.
- (2) **Intention:** If you intend to work on and learn math you are most welcome, however, if you intend not to, then you must arrange for an alternate option so that everyone has an opportunity to learn.
- (3) **Be prepared:** During passing period, and during the first two minutes of class is the time to sharpen your pencil, get your notebook, textbooks, start your warm up, get logged into the computer in the lab, and to be settled. If you do not have a pencil, borrow one from a friend or get one from the office. **If you are late, go to the office first to get a tardy pass. When late, do not disrupt the class by talking or being loud. If you are 10 minutes late, you will be marked absent. Do not interrupt the class because you are late, wait until a break to ask to get caught up.**
- (4) **Class time:** You are expected to have your work out and be actively working and learning. The warm up, or other instructions will be posted on the board, and it is your responsibility to be on task at the very beginning of class. Bathroom breaks will not be permitted during the first 15 minutes of class. During the last 1 minute of class, you are expected to put away tools, text books, calculators, log out, etc. Leaving class without permission is not tolerated, and you will be marked absent and need to meet with the principal.
- (5) **Computer Use:** In the lab, computers are reserved for the cognitive tutor math program only. After the first three minutes of class, the computers must only be used for these appropriate reasons. Check your email and get your music ready during that first 3 minutes! After one warning, violating this guideline will result in the loss of computer privileges until meeting with the principal.
- (6) **Cell phones:** Any use of cell phones is strictly prohibited in the classroom or lab. This includes making and receiving phone calls at any time. It also includes using the phone for internet or texting during instruction or group work and whole class work. If you violate this policy, you will only receive one warning during the school year, and then the phone will be confiscated, and can be retrieved at the end of class. If violated again, the phone can only be received by meeting with the principal.
- (7) **Music & Volume:** Music is encouraged if it helps you focus, but you must use it with headphones so nobody else can hear it. During times of instruction, group work, and class discussion, music must be off. You are expected to remain relatively quiet during all times in the lab and classroom. Many times we work in groups, and it is important that you focus your communication in a math-related way. Other conversations should not be present during class time.
- (8) **Food & Cosmetics:** There will be no food or drink allowed in the lab. In the classroom, snacks are permissible. Hot food and full meals are not allowed as they are very distracting and messy. Lastly, make-up, perfume, or other cosmetic items are not allowed to be out in the lab or classroom.
- (9) I have read, and I understand these classroom expectations, and I will try my best to abide by them and encourage others to do so as well. I agree that by disregarding any of these guidelines that I will receive consequences for my actions. These include one warning for the school year, then confiscation of any disruptive items. They may also include removal from class, meeting with principal, parent notification, suspension, and complete withdrawal from the class.

 Student Signature

 Date

 Parent Signature

 Date