

Robotics 91F Course Syllabus

Fall 2021

Course Title: Robotics 91F
Course Code: TQS91QQB-12
Semester: Fall 2021

Instructor: Mr. Heath (He/Him)
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Room: 222

Course Description:

Welcome to Robotics class! This semester we are going to be studying robots, computer science, and design thinking. Through hands-on construction and computer programming students will create robots that complete specific tasks, goals, or solve problems. Students will learn the history of robotics & computer science, in addition, to keeping up with new advances in the field of robotics through current event news articles, videos, and social media. A variety of robots and tools will be used in class, but students will primarily be work with Sphero and Lego Robotics kits.

Course Expectations

- ◆ All students and educators will recognize and respect each others' life experiences & identity (ethnicity, race, gender, sexual orientation, religion, age, etc.)
- ◆ Attend and participate in class and coursework—in person or virtually, when needed.
- ◆ Ask questions whenever you are confused, need clarity, or just curious about a topic. Questions are very important!
- ◆ Believe in your ability as a student of computer science and robotics!

Grading Policy

- ◆ Participation: 15%
- ◆ Classwork: 20%
- ◆ Homework: 15%
- ◆ Quizzes & Tests: 15%
- ◆ Projects: 20%
- ◆ Current Events: 15%

Semester Sequence & Units of Study:

- ◆ Unit 0: Engineering & Design Thinking (2 Weeks)
- ◆ Unit 1: History of Robotics & Intro to CS (3 Weeks)
- ◆ Unit 2: Robot Movement & Sensors (4 Weeks)
- ◆ Unit 3: Programming Decisions & Sequences (4 Weeks)
- ◆ Unit 4: Designing Bio-Inspired Robots
- ◆ Three Projects Throughout the Semester (1 Week per Project)

Grading Policy Description:

- ◆ **Participation:** Attending live or asynchronous lessons and completing classroom activities that build conceptual understanding. Participation is graded on completion and effort put forth.
- ◆ **Classwork:** Attending live or asynchronous lessons and completing classroom activities that practice or are applications of a concept. Classwork is graded on completion and effort put forth.
- ◆ **Homework:** Assignments or tasks related to the unit of study. Multiple options will be provided to students to allow for choice. Homework is graded on completion and comprehension.
- ◆ **Quizzes & Tests:** Assessments within units of study and at the end of them. Quizzes & Tests are graded on completion and comprehension.
- ◆ **Projects:** One project will be connected to the units of study and a smaller project outside the units of study that demonstrate application or deeper study of a mathematical topics. Projects are graded using project specific rubrics.
- ◆ **Current Events:** Weekly current event assignments will be done in class or outside of it. Current events will be created on completion & effort put forth.
- ◆ **All course work can be resubmitted for a higher grade with revisions.**
- ◆ **All course work will be accepted without a late-penalty up until final grades are submitted.**

Course Materials and Digital Tools:

- ◆ Course materials will be primarily teacher modified, adapted, and or/created following the Carnegie Mellon's EV3 Robotics Curriculum.
- ◆ Google Classroom will be used to assign, monitor, and grade student course work. In addition, it will be used provide asynchronous lessons and additional resources for students.
- ◆ Variety of Digital Tools will be used for instruction and assessment, including Code.Org, Scratch, littleBits, Pear Deck, Lumio, Nearpod, EdPuzzle, Kahoot!, Quizizz, and FlipGrid.
- ◆ Student Class Portfolios will be kept within the classroom and digitally to archive student learning, thinking, and growth.

Semester's Essential Questions

- ◆ **Unit 0: Engineering & Design Thinking**
 - What is the Engineering-Design Process?
 - How can we use the Engineering Design Process to solve problem?
- ◆ **Unit 1: History of Robotics & Introduction to Computer Science**
 - How do you represent quantities, patterns, and relationships?
 - How are properties related to algebra?
- ◆ **Unit 2: Robot Movement and Sensors**
 - How can we program robots to move how & where we want them to?
 - How can we incorporate sensors in movement or problem solving?
- ◆ **Unit 3: Programing Decisions & Sequences**
 - How do we program robots to make decisions in certain situations?
 - How can we create a sequence of code for robots complete tasks?
- ◆ **Unit 4: Designing Bio-Inspired Robots**
 - How can we use nature and biology to inspire and design robots?

Semester's Connection to the Blueprint CS4All NYC

- ◆ **Computer Science Foundations.**
 - **CS Perspectives**
 - Explorer, Creator, Innovator, and Citizen
 - **CS Practices**
 - Analyzing, Prototyping, and Communicate
 - **CS Concepts**
 - Abstraction, Algorithms, Programming, Data, and Networks