Overview of the chariot

In the first portion of the semester you will be working on a chariot that will be entirely made with parts you will manufacture, program and assemble. This is meant to teach you about the different technology and equipment available and to train you on them.



Manufacturing Training Center (MTC) labs

There are 3 parts that will be made at MTC. First is the chariot frame made by CNC that you will complete by marking, drilling and taping holes, second are the Arduino standoffs processed from a cylinder of delrin in a lathe and third is the caster spacer machined from a piece of acrylic with a mill.





Makerlab labs

The Makerlab will host the remaining 3 labs to complete the chariot. An additional technology that you will need to learn outside of lab time is 3D printing. This can be done any time the Makerspace is open and you can attend a workshop to get more familiar with the printers or ask a staff member or volunteer who is available. The pieces you will need to print are shown below.



The first lab is an Arduino programming lab where you will learn how to program this microcontroller, use existing libraries and example code and wire external components to it. You will read and transform data inputted to the Arduino by a sensor (ultrasonic), give commands to

an electronic component (DC motor) and interact via a UART serial connection with an external module (BluetoothLE).



BluetoothLE module

The next chariot lab consists of mobile app development. You will make the app that will be able to control the chariot with your phone once it is assembled. To do this you will use MIT App Inventor to design the visual aspects of the app (buttons) and program them with bloc programming. You will also learn the basics of soldering and circuitry.



Finally you will assemble all the parts. You will solder the Bluetooth module as well as the ultrasonic sensor to the Arduino and motor shield. Then you will put together the frame, motors and wheels with some hardware and be able to mount the Arduino assembly and batteries to it. Finally you will upload your code and test the functionality of your chariot and mobile app.

