

COMP 4500, Mobile Robotics I  
Spring 2018, Prof. Yanco

### **Lab 1: Building a Mobile Robot Base**

Out: Tuesday, 30 January 2018

Due: Tuesday, 6 February 2018, at the start of lab

Reading: The Art of LEGO Design by Fred Martin, on the course web site

**Overview:** This lab is focused on building a mobile base for your Wallaby, which will be used in future labs.

**What to do:** For the first labs, we will be using the Wallaby mounted on a mobile base. This base should have the ability to turn, which is most easily accomplished by building a chassis that has two rear wheels, each with separate motors, and some form of caster on the front (could be slides or caster wheels). Your base should also have a bumper its front, with touch sensors on the left and right sides of the bumper.

You can design your own base using materials in the lab (including Lego, K'Nex and Vex – but you need not feel limited to use only those materials). Plexiglas mounts are available for the modified servos, which will allow the servo to interface easily with Lego.

You can model your base after the Handy Bug 9719 described in Section 2.2.2 of the Martin book (pages 50 – 71), although you will need to adapt it to use the non-LEGO motors that we'll be using in the course. Ten copies of this book are available in the lab (and should stay in the lab). The parts are listed on pages 54 – 56, with the following corrections:

- p. 54, halfway down: 4 2x4 bricks listed (correctly) with incorrect picture (1x2 Technic beam). You need the 4 2x4 bricks, not the 1x2 Technic beam.
- p. 56, last item: 2 black rubber bands are listed. These are too small. Use 2 yellow rubber bands instead. (Better yet, as these will be hard to find in the bins, create a different bumper for your robot.)

You will need to modify the design to hold the Wallaby, but it shouldn't require too many changes. You will definitely need to modify for different touch sensors.

Regardless of your approach, you will need to have your mobile base completed before next Tuesday's lab. In our lab on Tuesday 2/6, we will be programming the robot, so it is important that your robot is ready to go. Your grade for this lab will be a binary grade, given on Tuesday 2/6 at the start of lab. If your robot is built, you will get full credit. If your robot is not built, you will get no credit. There is nothing to write up for this lab.