FEEG2001 – Systems Design and Computing

(Odometry Task – 10%)

**Tutor:** Dr Stephen Prior

**Technical help:** Tim Woolman, 13/1055 – Chris Malcolm, 25/2045 – Maurice Jones

177/2017 – Dave Hills

**Project Theme:** Odometry Task

**Background:** The most important aspect of any mobile robot is for it to be able to know exactly where it is at any point on its journey.

**The Design Brief:** You are required to design, build and program a simple robot that can drive a predetermined route (see course path). The vehicle must be able to drive to certain waypoints and when there, it must stop and indicate that it has reached that waypoint and then drive onto the next waypoint and repeat this action. At five special waypoints the system must deposit accurately an M&M to score points (10 points per WP).

You will work in teams of 4-6 to design, build and program a system capable of doing this.

There are a number of considerations that will apply to all outcomes:

* The controller must consist of the Arduino UNO, MD25 and the RD02 drive unit.
* The system must be as accurate as possible in all its movements.
* It must indicate via sound and/or LED that it has reached the predetermined points.
* The system must have a simple switch to start it (not a wire).
* The use of a 2 A fuse between the battery and the hardware is mandatory.
* The system cannot exceed an A4 footprint and a height of 350 mm.
* All the electronics must be safely embedded into the prototype – no loose wires!
* Solder all connectors properly – Do NOT solder to battery terminals.
* Protect the MD25 with a proper connector such as a Deans or XT60.

**Deliverables:**

* A functioning Mechatronic prototype with embedded Arduino software.
* Demonstration of the final prototype in a competition format.
* A print out of the Arduino sketch (A4 two pages per page, double sided) used for the final demonstration with extensive comments and authorship clearly marked in a header at the top.

**Assessment:**

Grades will be awarded for:

* Prototype performance - correctly driving the predetermined course with accuracy and speed, indicating each point along the way as stated above.
* Programming - how the final system was programmed.
* Build quality of the prototype - design, wiring, robustness, reliability, safety, etc.

**Deadlines:**

Trials will take place in the Design Studio at Boldrewood (177/3011) during the lab sessions in Week 7 (14-16 November). The Grand Final (top teams) will be held on the evening of Friday, 17 November starting at 18:30 hrs in the same location.

**Attendance:**

Attendance in the trials is compulsory. Failure to demonstrate any hardware at this event will result in a fail grade.

Course Path (All dimensions in mm):

This year we are going backwards, i.e. 13 to 0. The five special waypoints are denoted using an orange marker – Points 2, 4, 6, 8 & 10 (see below).

