CAST CPET-563 **Dr. Kaputa**
Spring 2018
Final Project Description

1. Introduction

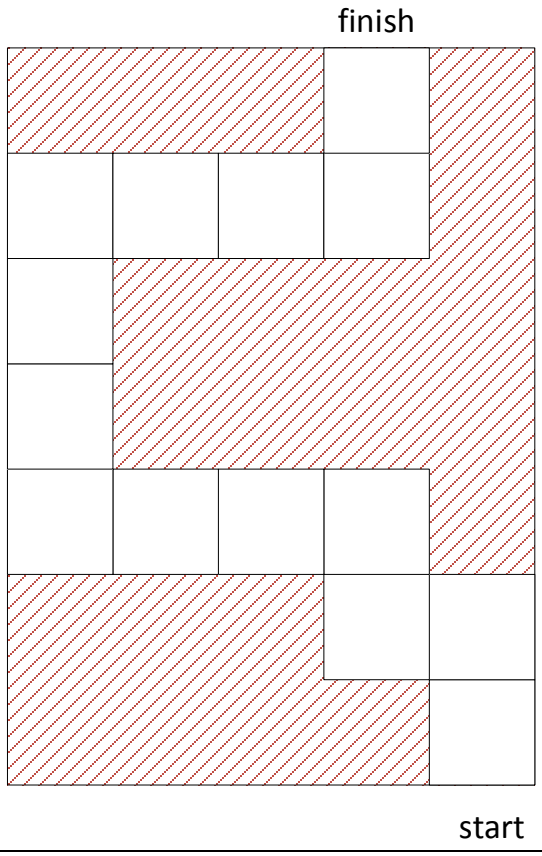
This is the final project for ESD II which is the culmination of the curriculum capstone experience for the Computer Engineering Technology program. This project consists of two phases which are discussed below in detail. Due to the complex nature of the challenges, groups shall be formed that consist of either three or four individuals. You are encouraged to divide up the work between team members, however you are expected to understand and be able to discuss at a detailed level each member of your team's specific design implementation.

The design sub-systems as well as management tasks are listed below although this may not be an exhaustive list. It is recommended to have at least two team member work on each section to reduce the risk of a single point failure.

o firmware	o systems integration
o software	o requirements development
o graphical user interface	o system and subsystem verification
o motor control	o program management [cost and schedule]
o sensor feedback	o risk register
o control algorithm	o documentation

Each topic will be covering in depth during the course however it is the student's responsibility to ask poignant questions that will help teams achieve the highest possible score for the competitions.

2. Known Map [autonomous]



Your rover shall traverse a known map and perform the following tasks:

- Move from the start to the finish as fast as possible
- Show the map as well as the rover position in real time via a GUI
- The walls are poison. Shall get two restarts in case the rover touches a wall
- Map shall only have straight pieces and 90 degree angles
- The map quanta is 2 feet which means that all distances of width and length must be multiples of 2 feet.
- The known map is shown to the left

Known Map Grading Rubric: [15 pts total, 3 pts competitive]

	Points
Total Time	**3 [teams ranked 1,2,3]**
Course Completion	4
GUI Appearance	4
GUI functionality/accuracy	4

3. Unknown Map [autonomous]

Exactly the same rules as the known map however the map will not be known beforehand. All teams will be graded on the same unknown map.

Unknown Map Grading Rubric: [15 pts total, 3 pts competitive]

	Points
Total Time	**3 [teams ranked 1,2,3]**
Course Completion	4
GUI Appearance	4
GUI functionality/accuracy [map accuracy]	4

4. Grading

The final project grade will be determined based upon the below chart

	Points
Known Map	15
Unknown Map	15
System Requirements Document	10
VCRM	10
Cost and Schedule Actuals vs Estimates	10
Test Procedure	10
Test Report	10
Focus Area Tech Memo [individual grade]	20
Videos	Not required but highly recommended
Total	100

5. Supplied Components

Rover	 https://www.sparkfun.com/products/10336

Rover Drive Board	 http://www.amazon.com/Motor-Controller-Channel-4-5A-4-5-12V/dp/B00B88F2A6
Ultrasonic Sensors [there will be 3 orthogonal sensors mounted on the front of the rover covering front, right, and left directions]	 https://www.amazon.com/Gowoops-Ultrasonic-Distance-Measuring-Transducer/dp/B00UJA1TAQ/ref=sr_1_1?ie=UTF8&qid=1488978310&sr=8-1-spons&keywords=hc+sr04&psc=1
Snickerdoodle	 http://krtkl.com/

6. Deliverables

1	system requirements document
2	VCRM [can be included in system requirements doc or as a separate xcell document]
3	cost and schedule estimates [Microsoft project]
4	system level qualification/verification procedure [this is a procedure of how you will test things]
5	focus area tech memo [code packet or design info for the subsystem that you were responsible for]
6	qualification report [results of your testing. Can be combined with your testing procedure]
7	formal presentation slides [PDR]
8	formal presentation slides [final presentation]
9	video of rover traversing known map

7. Tips

- Frontload your work on this project. Plan to finish at least 1 week ahead of time.

- See me to bless off your design before you go too far down the wrong path

- Use version control

- Meet at least weekly to keep all group members honest

- Clearly assign roles to all group members and set concrete delivery dates

8. Key Dates

Preliminary Design Review	4:40 pm – 6:40 pm in the ESD Lab on March 8th
Game Day	10 am – 5 pm April 28th at Imagine RIT
Final Presentations	4:40 pm – 6:40 pm in the ESD Lab on April 26th [last day of class]