GPRC

DEPARTMENT OF Science.

CS3120 -Experimental Mobile Robotics

Winter 2011

INSTRUCTOR:	Libero Ficocelli	**PHONE:**	780 539-2825
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OFFICE HOURS: By appointment

PREREQUISITE(S)/COREQUISITE: CS2290 or CS3290 co-requisite

REQUIRED TEXT/RESOURCE MATERIALS:

The Robotics Primer
By Maja Mataric

Robotic Explorations: An Introduction to Engineering
By Fred Martin
Copies will be made available in the lab

DESCRIPTION:

This course is inspired and modeled (roughly) after an MIT computer science/engineering course called 6.270 (LEGO Robot Design Competition). The course will provide students an opportunity to integrate knowledge of software and hardware design in the context of building an autonomous LEGO robot(s).

Students will become extremely familiar with the difficulties of designing hardware and software which must work in the **real world**; in contrast to the usual computer science simulated world.   Students will learn the basics of robot design techniques, terminology and concepts in the construction of working robotic systems.

Each student participates in a team of 2 students (special case group size of 1 or 3, if we have odd numbers) who will work together to assemble hardware, instrument sensors, write control software, and test their designs. The robot(s) will be constructed from off-the-shelf components: LEGO parts, assorted sensors (light, bumper, infrared), motors, and controlled by the *Handy board*. The Handy board is special purpose robotics board designed by Fred Martin at MIT, it houses a Motorola 68HC11A microprocessor, 32K RAM, a 2 line LCD screen as well as input and output circuitry. Robot control software will be written using Interactive C, a special purpose interactive programming language. Later on in the semester we willl also be making use of the Arduino controller board supported by the ADE (Arduino Development Environment).

Each team will be given a kit of the robot components at the beginning of the course and will be responsible for returning it in working order at the end of the semester.

Although the course is primarily seminar/project based it will include class lectures and lab instruction periods, brainstorming sessions and oral presentations. In a variety of required lab assignments each robot will be tested against a number of predetermined tasks and behaviors (line/wall following, obstacle avoidance, etc).

The comprehensive final project may entail some form of solo or head-to-head competition (details to be defined during the semester). Each team may be required to give periodic oral presentations, keep a working log (1 per team) and submit a final written report summarizing the robot development from design to implementation. Details on the final report content will be specified at later date.

CREDIT/CONTACT HOURS: 3 Credits – Lectures 3 Hrs; Lab 3 Hrs.

DELIVERY MODE(S): Lectures and Labs

TRANSFERABILITY: U of Alberta; U of Lethbridge; U of Calgary; Athabasca University
GRADING CRITERIA:

> 35 % -- Lab Assignments/Mini-projects
> 18 % -- Final Project
> 7 % -- Final report
> 10 % -- Log book (may include oral presentations)
> 30 % -- Term Exam – near the end of semester

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	**4-point Equivalent**	**Percentage Guidelines**	**Designation**
A$^+$	4.0	90 – 100	**EXCELLENT**
A	4.0	85 – 89	
A$^-$	3.7	80 – 84	**FIRST CLASS STANDING**
B$^+$	3.3	77 – 79	
B	3.0	73 – 76	**GOOD**
B$^-$	2.7	70 – 72	
C$^+$	2.3	67 – 69	**SATISFACTORY**
C	2.0	63 – 66	
C$^-$	1.7	60 – 62	
D$^+$	1.3	55 – 59	**MINIMAL PASS**
D	1.0	50 – 54	
F	0.0	0 – 49	**FAIL**
WF	0.0	0	**FAIL, withdrawal after the deadline**

EXAMINATIONS: One Term examination

STUDENT RESPONSIBILITIES:

CLASS and LAB attendance is **mandatory**. You must clear all absences with me; failure to comply will result in a failing grade for the course!