RYERSON UNIVERSITY

School of Computer Science

CPS 813/DG 8010 –Human Robot Interaction (HRI)
Course Management Form (Winter 2017)

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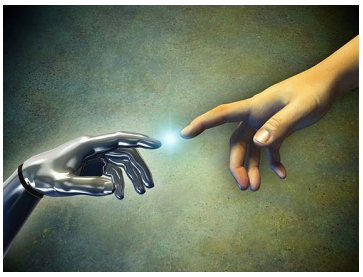

Description:
From the first moment a human picked up a stick and attempted to knock down some food from an unreachable location we have attempted to use technology to extend our influence in the world. This course will examine physical systems designed to extend the notion of human presence to remote locations. Topics may include Presence, Telepresence, Tele-robotics and Agency. The course is designed to provide students with a practical introduction to HRI that will involve the design and construction of working robotic systems designed to interact with remote environments.

Prerequisite: CPS607 (undergraduate) or permission of the instructor.

Course materials:
Lecture: ~1 hours/week (KHE 121),
Labs: ~2 hours/week (ENG 273). No Lab week 1,
Course Web Site: http://www.scs.ryerson.ca/~aferworn/courses/CPS813/INDEX.HTML
Course Media: Readings and other media will be provided.

Learning Outcomes
After successfully completing this course participants will be able to: explain HRI principles, paradigms and metrics, construct appropriate robots that can survive and function in a defined environment, and employ tele-operated robots to solve problems.

Evaluation:

Item	Value	Tentative Date
[α] Mid-Term test (take home, 1 week to complete)	30%	Given 13 March, Due 20 March
[Ω] Term Paper (Research paper, 10 pages minimum with citations from the literature)	30%	Given 13 March, Due 3 April (last day of classes)
Lab 1: Multiple interface wired robot maze	10%	Given Week 1, Due Week 3 (31 Jan)
Lab 2: The handicapped access door	10%	Given Week 3, Due Week 5 (14 Feb)
Lab 3: Wireless robot soccer	10%	Given Week 5, Due Week 7 (7 Mar)
Lab 4: Passing objects between robots	10%	Given Week 7, Due Week 10 (25 Mar)
Final Exercise[1]	30%	Given Week 10, Due Exam week.

[α] applies to a student registered in CPS813
[Ω] applies to a student registered in DG8010

Assignments and Labs

[1] The final exercise will use one of the application areas discussed in class as its basis.

Late assignments, tests and labs will not be accepted for marking. Labs and assignments must be submitted in the format detailed on the course web site. If they are submitted in any other fashion they will be deemed garbage and will be filed in a wastebasket (will not be marked!) Labs will be marked by a TA. The TA has the final say on the mark you receive...don't whine to the course instructors and be careful about whining to the TA. All labs and the final exercise must be completed in teams of three. You will not be allowed to work alone. A team will share marks for each of the labs. Do not screw-over your team. You may form your own teams. If you wish to change teams you must receive instructor permission. All labs are performance-based. This means that the team will be expected to demonstrate a robot that does what is required when the lab is due. To make it absolutely clear, YOU WILL HAVE TO WORK OUTSIDE OF THE LAB TO CREATE A ROBOT FOR YOU TO COMPLETE THE ASSIGNED TASK IN THE LAB PERIOD USING THE ROBOT.

If you do not wish to actually build robots, **DROP THE COURSE BEFORE IT'S TOO LATE.**

General

Announcements will be made in class...these will not be repeated, Details will often be provided on the announcements portion of the course web site. Students are responsible for checking the course web site for all instructions relating to the course and for announcements. This must be done at least once on the day of a class. Copied work (both copy and original) will be assigned a grade of 0. Involvement with plagiarism can ultimately result in course failure and/or expulsion from the University in accordance with the Ryerson Student Conduct Code. The course will consist of both lectures and laboratory sessions. Modifications to the course procedures will be made in consultation with the course students.

Selected topics

1. Human Robot Interaction Introduction, Taxonomy, Agency, Delegation
   A discussion of different models of robot interaction and control with humans and with each other.
2. Introduction to mobile robotic systems
3. Implementation 1: Building. A review of building techniques and introduction to rapid prototyping
4. Implementation 2: Computing and Networking for robots Crash Course
   The fundamentals of getting a camera-equipped, networked, interaction-enabled computing device ready to do what you want while attached to your robot.
5. Basic Robotic Interfaces
   Standard interface components, video, audio, telemetry, control metaphors
6. Alternative Robotic Interfaces
   What you do when the stuff above just doesn't cut it?
7. Presence and Telepresence
   We will examine the notion of being "present" when you are not.
8. Projecting Persona
   Ok, now you're rolling along and you want someone to know your robot will pass on the right…whose right? Making your presence felt at a distance and influencing what's at a distance through a robot.
9. Sensing and Manipulating in the robot's environment

Application areas that may be addressed

- Urban Search and Rescue (USAR), Chemical, Biological, Radiological and Nuclear explosive (CBRNe), Social robots, exploratory robots, space robots, robotic assistive device, medical robots, and the robotic augmentation of biology