CMP 438/738 Syllabus

**CMP 438/738: Communicating Robots.**

4 hours, 4 credits.Techniques and principles for building communicating robots. Programming on resource-limited systems, designing communications protocols, and testing distributed algorithms. Project to involve building a robot to work/compete with other robots. PREREQ: [CMP 338](http://www.lehman.edu/undergraduate-bulletin/cmp338datastructuresandalgorithmsi.htm%22%20%5Ct%20%22_self).

## Location and Meeting Times

**Room**: Gillet 227
**Days**: Monday and Wednesday
**Times**: 1:00 pm – 2:50 pm (10 minute break at about 2 pm)

**Webpage**: Blackboard course page.
I will upload all assignments and course materials to blackboard. Please make sure you can access it.

## Course Learning Objectives

After successfully completing this course, students will be able to:

1. Design and build a simple embedded system according to a provided specification.
2. Design and implement a simple protocol for exchanging information about a system’s environment.
3. Implement a robot that can detect and respond to environmental cues.
4. Design and implement a communication protocol to allow robots to work together.
5. Design distributed algorithms for cooperation between systems.
6. Program in a simple variant of the C programming language (“Not Quite C”).
7. Discuss and explain the issues raised by embedded systems.
8. Discuss and explain the issues raised by distributed systems.

## Instructor Information:

**Name**: Nancy Griffeth
**Contact**: nancy.griffeth@lehman.cuny.edu
**Office Hours**: MW 11 am – 1 pm

## Grading Policy

**Expectations**: Students will build robots to address several challenge problems, such as building a robot to follow a line; building a robot to detect and move to a light source; and building a robot to communicate.

Master’s students will take the initiative to define, document, and disseminate strategies for competing as a team against other teams.

**Quizzes**:  There will be occasional pop quizzes if I find it necessary.
**Projects/Labs**: There will be weekly or bi-weekly assignments to build robots to accomplish specific tasks. Success must be demonstrated in class. There will be a final project, executed by student teams and by the class as a whole, to build robots to cooperate in teams and to compete with other teams, in a game to be defined.
Master’s students will make a presentation and turn in a document describing strategies for cooperating and competing in the final challenge problem.
**Exams**: There will be a midterm and a final.

**Undergraduate Grading Breakdown:**Individual Robot Tasks & Quizzes: 25%
Midterm: 10%
Team Robot Task: 50%
Final: 15%

**Master’s Grading Breakdown:**Individual Robot Tasks & Quizzes: 20%
Midterm: 8%
Team Robot Task: 35%
Final: 12%
Presentation and Report: 25%

Attendance Policy

From the student handbook: “Students are expected to attend classes regularly, and instructors are required to record attendance for grading and counseling purposes. Individual instructors, as well as departments or degree programs, may establish specific attendance requirements.

“Instructors have the right to weigh attendance and class participation in determining grades. It is the student’s responsibility to ascertain the effect attendance may have on the grade in a course. Students receiving financial aid must be certified as attending classes regularly for continuing eligibility.”

*For this class, students must be come to labs to receive credit for their success in building specific robots. Students must also be present for the final team competitions to receive a grade for their project.*

## Academic Integrity and Plagiarism Policy

A statement may be found in student handbook. Students are responsible for knowing and abiding by the policy. For more information refer to <http://www.lehman.cuny.edu/student-affairs/documents/student-handbook-02.pdf>

## Materials, Resources and Accommodating Disabilities

**Textbook**: Dave Baum, The Definitive Guide to Lego Mindstorms Robots.

**References**:
Dave Baum, Michael Gasperi, Ralph Hempel and Luis Villa. Extreme Mindstorms: an Advanced Guide to Lego Mindstorms.
David Cook, Robot Building for Beginners.

**Equipment**: The lab in Gillet 231 will be home to about 40 Lego Mindstorms Robots. You may use this room whenever it is open and not in use for other classes; I will try to arrange that it is available as often as possible.
Each student may check out one “brick” (the robot’s mind) for the term and also may check out a second one for shorter periods, subject to availability. Students will be provided with plastic boxes to carry their robots and building materials. Each student must return all materials that he or she checked out, before a grade will be submitted for the student.

**Accommodating Disabilities:**  Lehman College is committed to providing access to all programs and curricula to all students.  Students with disabilities who may need classroom accommodations are encouraged to register with the Office of Student Disability Services.  For more info, please contact the Office of Student Disability Services, Shuster Hall, Room 238, phone number, 718-960-

## Course Outline

1. Building a sturdy robot.
2. Avoiding obstacles.
3. Following a line.
4. Moving toward the light.
5. Midterm
6. Working with objects.
7. Communicating and cooperating.
8. Competing.
9. Final Project and Exam.

**Final Exam**: The Final Exam will be given during Finals Week and will cover the entire course

This syllabus is also available on Blackboard.