

# Engaging Undergraduates in RESEARCH and INQUIRY: A Scholarly Dialogue



## Intelligent Robot Design

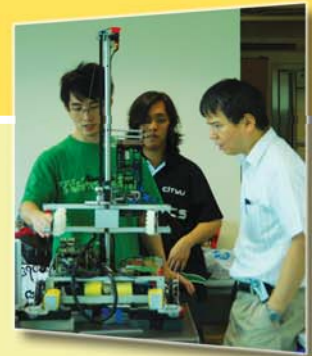
### Course Instructor/Project leader

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## Project/Course Objectives

### Course Intended Learning Outcomes (CILO)

Upon successful completion of this course, students should be able to:

1. Describe the basic mechatronic elements and major issues involved in developing an autonomous robot.
2. Design mobile robotic systems conceptually and theoretically for tackling any emerging problems.
3. Develop hardware and software systems for the mobile robots for achieving the assigned tasks.
4. Extend the capability of the robot by adding machine intelligence to cope with uncertainties in the working environment.
5. Demonstrate reflective practice in an engineering context.
6. Demonstrate effective team work.



## Inquiry Based Learning Activities

- Each team was required to modify an existing mobile robot, formulate strategies and develop intelligent software to solve a given task.
- Students were required to identify appropriate technologies, gather useful information, source suitable components, design and build the robots in the laboratory.
- Small class activities such as tutorials and group discussions were organized to help students integrate and reflect on what they had learnt from other courses.
- A competition was held at the end of the course to compare the performance of the robots developed by different teams.

### How did you assess the effectiveness of students' learning?

For CILO 1, 2, 3, 5 and 6, students were assessed based on the report, oral presentation, demonstration, reflective journals and peer evaluation. Students were expected to demonstrate their overall engineering design capability.

CILO 4 was assessed based on the outcomes of the demonstration and the final competition. The students were expected to demonstrate their robots:

- To cope with unexpected variations in the game field
- To recover from the interferences, such as collision, from other competitors' robots during the competition.

### What were the major outcomes of this project/course? Do they match with your objectives?

The physical robots and game strategies developed by the students for solving the given tasks are the concrete evidence to show that students have achieved the intended learning outcomes.