

Symposium on Engaging Undergraduates in Research And Inquiry:

A scholarly Dialogue, May 20, 2011, HKUST

1. Project/Course title

Course Title: Intelligent Robot Design
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2. Project/Course team

Name	Institute	Post	Department/ Division	E-mail
<i>Course Instructor/Project leader:</i>				
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BEFORE

3. Project/Course objectives (Intended Learning Outcomes) *(Suggested number of words 30-40 words)*

What did you intend students to learn from this project/course?

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 immerging 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.

DURING

4. Inquiry Based Learning Activities (*Suggested number of words: 75-85 words*) *What did students do (inquiry-based learning activities) during the course/project?*

Students were organized into teams. Each team was required to modify an existing mobile robot, formulate strategies and develop intelligent software to solve a given task. A competition was held at the end of the course to compare the performance of the robots developed by different teams. Small class activities such as tutorials and group discussions were organized to help the students to integrate and reflect on what they had learnt from other courses. Laboratory activities were arranged to re-enforce students' practical skills for building the robots. The roles of the technical staff and team instructors were mainly acting as facilitators and answering questions on technical issues. Students were required to identify appropriate technologies, gather useful information, source suitable components, and design and build the robots.

AFTER (Suggested number of words for items 5 & 6: 50-60 words)

5. How did you assess the effectiveness of students' learning?

Please give an account of the assessment methods and results.

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, including

- Formulating and classifying the specifications,
- Selecting relevant principals and proposing possible solutions for the design, and lastly
- Producing a correct solution and demonstrating the validity of the design.

Student's achievement on 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, such as variations in lighting condition, colour of floor materials and dimensions of the objects.
- To recover from the interferences, such as collision, from other competitors' robots during the competition.

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

Intended Learning Outcomes (objectives)?

Examples of outcomes include educational software, improvement in student learning or change in student attitude.

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.