Engaging Undergraduates in RESEARCH and INQUIRY:
A Scholarly Dialogue

ELEC125: Introduction to Electro-Robot Design

Course Instructor/Project Leader

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Members

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Project/Course Objectives

On successful completion of this course, students will be able to

CO1: recognize the history and development of major Electronic & Computer Engineering (ECE) fields.

CO2: analyze, design, and debug simple analog circuits, combinatorial and sequential logic circuits, and design and implement simple feedback control strategies.

CO3: build a real engineering system following a hierarchical design principle.

CO4: work in a team environment: learn and practice effective project and time management.

CO5: execute a complete project from problem formulation, design/implementation, up to verification and documentation.

Inquiry Based Learning Activities

Lectures: acquired key concepts and theories (CO1, CO2)

Tutorials: reviewed worked examples (CO2); and learned and practiced presentation skills and team-working skills. (CO4)

Labs: learned how to use the frequently used electronic instruments. (CO2); designed the robot step by step. (CO3); and designed and debugged circuits and implement robot controllers (CO2)

Projects: applied the knowledge and principles learnt to design and built a functional robot (CO2); built a functional robot using hierarchical design (CO3); worked in a team environment (CO4); executed a complete project (CO5).
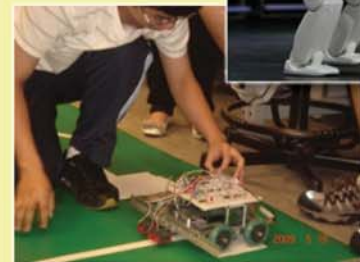
How did you assess the effectiveness of students' learning?

- Multiple choice and fill-in-the-blank questions in quizzes and homework to test whether students recognized major historical events and developments in electronic and computer engineering (CO1);

- Circuit analysis and design questions in quizzes, homework, both written and practical lab mid-term exams and lab demonstrations to test whether students could apply the theories learned in lectures (CO2);

- Final project demonstration to test whether students could design and build a functional robot following a hierarchical design principle (CO3), work effectively in a team (CO4), and execute a complete project (CO5).

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

The major outcomes of this course are that: students got accustomed to working as a team; acquired a broader knowledge of electronic and computer engineering; applied the theories and built a functional robot in the end. The outcomes match well with our intended learning outcomes.