ECE 4902: Electrical and Computer Engineering Design II

Credits and contact hours: 3 Credits (One four-hour laboratory period and a team meeting per week)

Instructor: Team-taught (coordinator: John Chandy)

Textbook: none

a. *Other supplemental materials*: none.

***Specific course information*:**

a. *Catalog Description*: (Also offered as CSE 4951). Design of a device, circuit, system, process, or algorithm. Team solution to an engineering design problem as formulated in CSE 4950/ECE 4901, from first concepts through evaluation and documentation. Written progress reports, a final report, and oral presentation are required.
b. *Prerequisite*: ECE 4901; open only to students in the School of Engineering and declared Computer Science minors.
c. *Required, elective, or selected elective:* Required

***Specific goals for the course*:**

a. *Specific outcomes of instruction*: Students will be able to
    - apply their engineering knowledge to solve open-ended design problems using a team approach.
    - Build, test, redesign, and validate the final solution against given project specifications.
    - search for, acquire and use new knowledge from multiple sources.
    - communicate their engineering solutions in writing and orally.
    - recognize the broader context of their engineering design solution.

b. *ABET Criterion 3 Student Outcomes addressed by the course*:

(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
Students continue the analysis of their projects (begun in the previous semester) to ensure meeting operational goals by applying information learned in mathematics, science and engineering,

(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
The course is based on a systems approach whereby each project is broken into relevant components which are assembled into a whole. Each module is assessed to ascertain whether specifications are met. Non-technical issues such as economics, safety, ethics, sustainability, social and environmental concerns are taken into account as appropriate.

(3) an ability to communicate effectively with a range of audiences
Students write a detailed final report. In addition, students submit written weekly reports on project status. Students give two oral presentations using PowerPoint (design review and final presentation).

(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
Students discuss the broader societal context for their design solutions in their presentations and their final report.

(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
Student teams formed in the previous semester continue the iterative design and implementation process using a collaborative team approach. The teamwork is guided and monitored by a faculty advisor.

(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
In the process of creating a design solution, students test the feasibility of modules within their projects by (as needed) building prototypes, conducting experiments, collecting data, and analyzing results.

(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
Students use the web, library databases, and other resources to study existing designs, choose components, and troubleshoot their hardware/software.

Topics covered:

- Teamwork
- Project reports and oral presentations
- Electrical/Computer engineering design and modeling
- Prototyping and system evaluation