ECE 416: Senior Project Design II

3credits, 3 contact hours. The course is required in COE and EE programs

INSTRUCTOR: Xuan Liu; Office: ECE 317; Tel: 973.596.5693; email: xliu@njit.edu

Office hours: Thursday 12-2pm or by appointment

TEXTBOOK(S) REQUIRED: None; **PREREQUISITES:** ECE 414.

DESCRIPTION

Students are required to continue and complete projects based on proposals approved in ECE 414. The progress of the project is monitored by the instructor with demonstrations and presentations at posted due dates. An oral presentation and demonstration of the completed project by the student team must be given. A written report is submitted at the end of the course. Successful projects are selected for the Senior Design Project Showcase where project teams make presentations and demonstrations in front of the audience of students, faculty and industry representatives.

 Specific Course Learning Outcomes (CLO): The student will be able to:

1. Work on complex engineering projects; manage teamwork including setting completion schedules, project milestones, and the assignment of responsibilities for each team member.
2. Perform requirements analysis and provide sufficient details in understanding both the functional and non-functional requirements of the system that is to be developed.
3. Produce a written design document that provides sufficient details in understanding how the system is to be developed.
4. Fully understand the ethical issues that arise in the design of the system and the use of the system. Understand societal impact of engineering design.
5. Present and explain details of the designed system at different levels of implementation throughout the course.
6. Continuously perform independent learning of current and new technologies and concepts in order to complete the project.
7. Research, select, learn and utilize the necessary engineering tools and techniques that are needed to complete the project.

 Relevant Student Outcomes (ABET criterion 3):

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (CLOs 1, 2, 3)
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 (CLOs 2, 4, 5, 6)
3. an ability to communicate effectively with a range of audiences (CLOs 3, 5)

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 (CLOs 3-5)
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 (CLOs 1, 3, 6, 7)
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (CLOs 1, 2, 3)
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies (CLOs 6, 7).

Academic integrity

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the code of Academic Integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Office of the Dean of Students. Any student found in violation of the code by cheating, plagiarizing, or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Office of the Dean of Students at dos@njit.edu.

Use of AI

Student use of artificial intelligence (AI) is permitted in this course. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI.

Grading criteria

1. Attendance of one-on-one meetings – 10%
2. Mid-term hardware checkup – 10%
3. Senior design showcase qualifying presentation – 10%
4. Working prototype and system performance
   ○ Project complexity, challenges, and potential impact – 20%
   ○ Development goals achieved - 30%
     ▪ Projects are graded based on written rubrics at the final hardware checkup.
   ○ Documentation and presentation – 20%
     ▪ The final report is graded based on written rubrics.
5. If a project qualifies for the senior design showcase and the team presents in the showcase, the team will receive an upgraded grade (B+ to A, B to B+ and so one).

Successful demonstration and presentation of the working device/system will qualify teams for participation in the Senior Design Project Showcase Presentation at the date to be announced.

A   >=90
B+   85-89
B   80-84
C+   75-79
C   70-74
D   60-69
F   <60

Late submission of assignment without proper justification is not acceptable.

Facilities

A lab room with the standard benchtop instruments and additional equipment from the stockroom will be available during the course's scheduled time. Open Labs will be available to the project teams. Outside the school, project teams can work at places of their choice. NJIT Makerspace can be a great asset to build project prototypes. Check with the Makerspace about access and training. A limited number of basic laboratory instruments (oscilloscopes, power supplies, and meters) may be offered to the project teams on loan. ECE