Course Syllabus
ELCT 403 – Capstone Design Project I

Course Coordinator: Undergraduate Program Committee

Catalog Description: Planning, preliminary design, and prototyping. Analysis and specification of system and subsystem requirements, measures of performance, analysis of alternatives, effective team work. Project management and scheduling. Prototype implementation and characterization. This course should be taken during student’s penultimate semester.

Credit Hours: 3 (42 contact hours)

Prerequisite(s) by course: D or better in ELCT 302

Prerequisite by topics: In penultimate semester prior to graduation, or consent of instructor


Other Materials: Class notes posted on Blackboard

Learning Outcomes:
Students who successfully complete the course will be able to:

1. Develop system requirements from top-level customer requirements.
2. Analyze and compare design alternatives, at the system and subsystem levels, and use measures of performance or other criteria to rank alternatives
3. Plan and organize an engineering design project using tools such as Gantt charts to develop a work breakdown structure, develop a schedule including milestones, and estimate effort and costs.
4. Develop a design concept and elaborate it through to a detailed design by decomposing a system concept into component subsystems, identifying the subsystem requirements and applicable standards, and defining interfaces between the subsystems
5. Build prototypes of key subsystems
6. Design appropriate tests to measure and evaluate the performance of prototype subsystems to determine whether they meet performance and interface requirements and recommend changes where they do not.
7. Constructively contribute to the accomplishments of a multidisciplinary team, including critical evaluation of self and team-member performance
8. Communicate the team’s logistical and technical approaches to the design project in a polished, co-authored, written proposal, using language and graphics appropriate to the technical discipline.
9. Succinctly report individual and team performance against the plan
10. Describe organizational and technical plans and progress in oral presentations, using high-quality, informative, graphical and textual elements.

Course Topics:
- Analysis and specification of system and subsystem requirements
- Analysis of alternatives
- Measures of performance
- Effective design strategies, brainstorming, collaboration
- Intellectual property
- Project management and scheduling, Gantt chart, MS Project
- Oral presentation skills, effective graphics in presentations
- System characterization, design of qualification tests
- Methods for effective and efficient collaborative development and revision of documents
- Effective teamwork, team expectations, team member evaluation
Course Contribution to Program Outcomes:  
ELCT 403 contributes to an achievement of:

- **Outcome 1** -- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- **Outcome 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.
- **Outcome 3** -- an ability to communicate effectively with a range of audiences.
- **Outcome 4** -- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal context.
- **Outcome 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.
- **Outcome 6** -- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusion.
- **Outcome 7** -- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**General Course Policies**

**Academic Integrity**
This is a team-oriented class so you are expected to build on the work of others. Nonetheless, individual contributions should not be obfuscated and external sources of ideas should be recognized and credited. Every team member is expected to contribute in some substantial way to every team assignment. But every individual assignment should predominantly be the work of that individual; contributions of others should be recognized appropriately, perhaps in an Acknowledgements section. All students are expected to follow the University of South Carolina Honor Code and should expect that every instance of a suspected violation will be reported. Students found responsible for violations of the Code will be subject to academic penalties under the Code in addition to whatever disciplinary sanctions are applied.

**Accommodating Disabilities**
Reasonable accommodations are available for any student with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by LeConte College Room 112A. All accommodations must be approved through the Office of Student Disability Services.

**Diversity**
In developing the semester schedule, we have attempted to avoid conflicts with major religious holidays. If, however, we have inadvertently scheduled an event that creates a conflict with your religious observances, please let the instructor know as soon as possible so that other arrangements can be made.

**Amending the Syllabus/Rules**
Amendments and changes to the syllabus, including evaluation and grading mechanisms, are possible. The instructor will initiate any such changes, considering input from the class.