Course Syllabus

ELCT 404 – Capstone Design Project II

Course Coordinator: Undergraduate Program Committee

Catalog Description: Capstone design project: Final design and implementation

Credit Hours 3 (42 contact hours)

Prerequisite(s) by course ELCT 403

Prerequisite by topics Project planning and preliminary design

Required Textbook Pocket Book of Technical Writing for Scientists and Engineers

Microsoft OneNote Online Application
http://www.nirmaltv.com/2010/06/09/access-onenote-online-with-onenote-web-app/

Other Materials Class notes posted on Blackboard

Course Outcomes:

Students who are successful in this class (i.e. earn C or better) will demonstrate at least the abilities to:

- Implement the steps of design iteration including consideration of user or evaluator feedback, observed performance of prototype subsystems, refinement of requirements, and refactoring of a design to arrive at a final detailed design.
- Implement final design details in complete hardware and software solutions.
- Design appropriate tests to measure and evaluate the performance of refined subsystems to show that they meet performance and interface requirements.
- Develop a plan to successfully and incrementally integrate, test, and qualify subsystems to end up with a complete system.
- Quantify and evaluate functionality and effectiveness of the finished system relative to the user or customer requirements.
- Identify innovative features of the system or its subsystems, relate these to the state of the art, and complete an invention disclosure that defines these innovative features for possible protection of intellectual property.
- Develop a plan for bringing the prototype system to market, including identification of a target market, definition of additional technical improvements that are needed to meet the market requirements, identification of IP agreements or licenses that would be needed, and estimate of manpower and time required to bring to market.
- Constructively contribute to the accomplishments of a multidisciplinary team, including critical evaluation of self and team-member performance
- Develop a technical manual for the final product
- Report progress in oral presentations, using high-quality, informative, graphical and textual elements.

Students who demonstrate higher proficiency will earn higher grades.

Course Topics:

- User requirements
- Design iteration
- Design for reliability
Course Contribution to Program Outcomes:
ELCT 404 contributes to an achievement of:

- Outcome A – an ability to apply knowledge of mathematics, science and engineering
- Outcome B -- an ability to design and conduct experiments, as well as to analyze and interpret data
- Outcome C -- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- Outcome D -- an ability to function on multidisciplinary teams
- Outcome E -- an ability to identify, formulate, and solve engineering problems
- Outcome G – an ability to communicate effectively
- Outcome I – a recognition of the need for, and an ability to engage in life-long learning
- Outcome K – an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

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.
Course Delivery Structure:
Weekly lectures, group project, open lab hours, interactive lab hours

Course Assessment

<table>
<thead>
<tr>
<th>Individual Grades</th>
<th>Group Grades</th>
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<tbody>
<tr>
<td>System Integration Plan</td>
<td>Revised proposal, deliverables contract</td>
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<tr>
<td>Utility assessment</td>
<td>Commercialization Plan</td>
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<tr>
<td>Oral Presentation</td>
<td>Final Product Demonstration</td>
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<td>Status Reports</td>
<td>User Documentation</td>
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<tr>
<td>Peer Evaluations</td>
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<tr>
<td>Participation</td>
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<tr>
<td>Notebook</td>
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Rubrics will be used to grade all assignments and the rubrics will be visible in Blackboard prior to the due date of the assignment. Numerical values of semester grades will be converted to letter grades using this scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90 – 100</td>
</tr>
<tr>
<td>B</td>
<td>80-86, B+ 86-90</td>
</tr>
<tr>
<td>C</td>
<td>70-76, C+ 76-80</td>
</tr>
<tr>
<td>D</td>
<td>60-66, D+ 66-70</td>
</tr>
<tr>
<td>F</td>
<td>less than 60</td>
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Course Outline/Schedule

Below is the general schedule. The more detailed calendar and due dates for all assignments are posted on BlackBoard. Any changes in the schedule or due dates will be indicated on Blackboard.

Course Schedule

<table>
<thead>
<tr>
<th>Course Schedule</th>
<th>Time</th>
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<tbody>
<tr>
<td>Semester overview and expectations. Design iteration. Refinement of requirements.</td>
<td>Week 1</td>
</tr>
<tr>
<td>How you should prepare for the Detailed Design Review. Subsystem validation and system integration.</td>
<td>Week 2</td>
</tr>
<tr>
<td>Detailed Design Review (schedule individual team meetings)</td>
<td>Week 3</td>
</tr>
<tr>
<td>Subsystem testing, qualification, and system integration plan</td>
<td>Week 4</td>
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</tbody>
</table>
• Extemporaneous presentations of project status. Week 5

• Developing a Commercialization Plan Week 6

• Patent status review Week 7

• Interim Progress Review (schedule individual team meetings) Week 8

• Invention Disclosure process and forms. Writing the Product Technical Manual Week 9

• Assessing product utility. Comparison to customer requirements. Meeting expectations. Week 10

• Final Demonstrations Week 11

• Senior Exit Survey and Interview Week 12

• Wrap-up class meeting Week 13

Instructor Policies

Attendance Policy
The university policy on course attendance will be enforced. You should attend every class except with an approved excuse. Excessive absences may incur a grade penalty. Class absences (among other things) will affect your participation grade.

Participation Policy
Substantial, and substantially-equal, participation is expected from every team and from every class member. The participation requirement applies whether or not the instructor or TA are present. Speak up in team meetings, speak up in class, participate in discussions, ask questions, do your research, analyze problems, talk to your project sponsor, be inquisitive, try things, seek answers, seek solutions, contribute. According to the grading formula, failure to fully participate will subtract from your earned semester average.

Expectations for Classroom Behavior
Please be respectful of each other, the instructor, and others in class and in lab. We are all here to learn! Any disrespectful or disruptive behavior may result in referral to the Office of Student Judicial Programs.

Assignment Submission
All written assignments and presentation files will be submitted via BlackBoard in PDF format. Assignments are generally due at midnight on the due date. Any exception will be noted on Blackboard. If you are not familiar with Blackboard, you should plan to submit your assignments well before the deadline in case you encounter technical difficulties. Late assignments will generally be penalized, except in the case of failures of the Blackboard system itself.

Expectations of the Instructor
I understand that students expect me to facilitate their learning, to answer their questions appropriately, to be fair and objective in grading, to provide timely and useful feedback on assignments, to maintain adequate office hours, and to treat them as I would like to be treated in their place.