**ELEN 4998 Senior Design Project**

**Credits and contact hours:** 3 credit course, meeting for 2 hours lecture, 2 hours lab weekly.

**Course coordinator:** Chandana Tamma

 **Texts:**

* *Principles of Design*, Marquette University
* *Technical Writing: A Practical Approach, 7th edition,* by Pfeiffer
* *Harvard Business School Project Management Manual*

**Catalog description:** Course focuses on detailed design, prototyping, and testing design concepts. Course includes topics directly relevant to student design projects and careers in the engineering profession. Student team design projects culminate in a final report that documents the performance and details (engineering drawings and/or documentation) of their final design.

**Prerequisites:** ELEN 4920

**Required**

**Professional component:** Engineering Design - 100 %

**Course Goals:** This course gives Electrical Engineering students experience in applying the concepts learned in ELEN 4920 (EECE 146) as well as technical expertise acquired in previous courses to practical engineering projects. These projects are group projects composed of interdisciplinary teams as required by each project. This course is intended to develop each student’s 1) analytical and design skills and capabilities, 2) ability to manage the product development process, 3) ability to work effectively in teams, and 4) written technical communication and oral presentation skills. Students will be exposed to a results-oriented evaluation of their design projects.

**Specific outcomes of instruction***By the end of this course, students should be able to perform the following tasks:*

* 1. Function in multi-functional integrated product development teams and apply methods that facilitate team creativity to a results-oriented evaluation structure of their design project.
	2. Use the factors needed in the detailed design process.
	3. Implement efficient testing procedures that can lead to a maximum of information using the minimum number of tests.
	4. Put into service the methods that can be used to describe the major elements of a project, its deliverables, and milestones; and the techniques that can be employed to develop a work breakdown structure.
	5. Incorporate into your designs the constraints as presented by product liability and safety issues, and Common Engineering codes and standards (e.g., ISO, ANSI, NIST, ITU, IEC, etc.), and have an awareness of ASTM Standard preparation procedures, ISO 9000 documentation, and general procedures.
	6. Apply the various types of electrical, mechanical, and software documentation needed to effectively complete a project.
	7. Implement procedures using various time management strategies and prioritization schemes.
	8. Appreciate various personal investment strategies, investment opportunities, and decision-making factors.

**Student outcomes addressed by the course:**Partial fulfillment of Criterion 3 objectives A, B, C, D, E, F, G, H, J, K

**Brief list of topics to be covered**

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| * Project scheduling
* Risk management in design
* Design validation
* Experimental design
* Human factors in design
* Embedded systems integration
* Software validation
* Software/database design
* Electrical documentation
* Mechanical documentation
* Software documentation
* The GRID
 | * Universal and accessible design
* Green/sustainable design
* Globalization
* ISO 9000 and other international standards
* Stage-gate process
* Personal and professional liability
* Personal finance
* Career management
* Presentations
* Data Science
* Computer networks
* Six Sigma
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