University of Puerto Rico
Mayagüez Campus
College of Engineering
Department of Electrical and Computer Engineering
Bachellor of Science in Electrical Engineering

Course Syllabus

1. General Information:

Alpha-numeric codification: INEL 5195
Course Title: Design Project in Electrical Engineering
Number of credits: 3
Contact Period: 1 hour lecture, 4 hours laboratory per week

2. Course Description:

English: Capstone design course in which students apply the fundamental knowledge in electrical engineering to solve engineering problems considering engineering standards and realistic design constraints.

Spanish: Curso de experiencia de diseño en el cual los estudiantes aplican los fundamentos de ingeniería eléctrica para solucionar problemas de ingeniería, tomando en consideración los estándares de ingeniería y restricciones realistas de diseño.

3. Pre/Co-requisites and other requirements:

Permission of the Departmental Director

4. Course Objectives:

In this course, students should demonstrate their capacity to understand and manage all aspects related to the solution of a problem in Electrical Engineering, based on their knowledge acquired in previous courses. The student should demonstrate his/her capability to solve a real engineering problem.

5. Instructional Strategies:

☒conference ☐discussion ☐computation ☒laboratory

☐seminar with formal presentation ☐seminar without formal presentation ☐workshop

☐art workshop ☐practice ☐trip ☐thesis ☐special problems ☐tutoring

☐research ☐other, please specify:

6. Minimum or Required Resources Available:

The course includes 4 hours of laboratory work per week for the development, modeling and implementation of the project, depending on its scope and nature.

7. Course time frame and thematic outline

Outline	Contact Hours
Introduction to Capstone Design	1
Seminars on topics such as: - Product specification - Budgeting - Ethics - CAD Tools	12

- Environmental and social issues related to the Engineering Practice - Project Management - Any other as the design projects dictate	
Oral presentations	4
Laboratory project work	56
Total hours: (equivalent to contact period)	75

8. Grading System

☒ Quantifiable (letters) ☐ Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
☐ **Exams**		
☐ **Final Exam**		
☐ **Short Quizzes**		
☒ **Oral Report**	**2**	**20**
☐ **Monographies**		
☐ **Portfolio**		
☒ **Projects**	**1**	**60**
☐ **Journals**		
☒ **Other (Specify): Progress Report**	**2**	**20**
TOTAL:		**100%**

10. Bibliography:

- Standard such as National Electric Code (NEC), Federal Comision of Communication (FCC), National Electric Safety Code (NESC), Federal Drug Asociation (FDA) regulations
- IEEE Publications and Standards: http://ieeexplore.ieee.org/xpl/standards.jsp
- OSHA Publications: http://www.osha.gov/pls/publications/publication.html
- CRC ElectricalEngineeringNetbase: http://www.electricalengineeringnetbase.com/
- CRC ENGnetBASE: http://www.engnetbase.com/ejournals/categories/default.asp
- Electronic Design: http://electronicdesign.com/
- WEB-EE: http://web-ee.com/

Books:
-Ford, Ralph M., "Design for Electrical and Computer Engineers: Theory, Concepts, and Practice", McGrawhill, 2008
-C.L. Dym, and P. Little, Engineering Design: A Project-Based Introduction, 2nd Edition, John Wiley, 2003.
-G. Voland, Engineering by Design, 2nd Edition, Prentice Hall, 2004
-J. Eric Salt and R. Rothery, Design for Electrical and Computer Engineers, John Wiley, 2002
- Smith, Karl A., "Teamwork and Project Management", McGraw-Hill, Boston 2000. Second Edition.

11. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry

Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

12. Course Outcomes	**Map to Program Outcomes**
Students must satisfy for all design projects the following outcomes by:	
1. Developing and conducting the laboratory work or simulation or prototyping and troubleshooting where applicable to evaluate the design. Results and data are correctly interpreted.	(b)
2. Following logical and orderly design procedures based on a set of specifications. Alternatives and decisions are clearly documented along the design process, and include considerations of codes, protocols, and engineering and safety standards related to the design area.	(c)
3. Identifying and describing a problem that can be solved with the skills related to the field of study. Students are able to compare different alternatives to present a suitable solution. Their solution shows their ability of physical thinking, approximation and simplification.	(e)
4. Writing well organized project documents and presentations. The work should make proper use of language (Spanish or English), and use schematics, tables, graphics, mathematical equations, as appropriate.	(g)
5. Analyzing the social and environmental impact. The analysis may discuss economic implications, such as entrepreneurship potential, sustainability, usability, and employment substitutions.	(h)
6. Using information and bibliographic resources, and finding specialized tools, software or supplies necessary for the project. The reference list is included and discussed in the documents.	(i)
7. Discussing contemporary issues related to the project such as innovations, business opportunities, and local needs.	(j)
8. Making appropriate choice and use of specialized tools, software, or hardware to complete the design or to collect and analyze data.	(k)
Students may satisfy the following outcomes depending on the particular design project by:	
1. Applying fundamentals of mathematics, science, probability and statistics to solve or to analyze an engineering problem when applicable. Economic aspects are considered as appropriate.	(a)
2. Demonstrating an ability to organize the team assigning responsibilities, balancing the work load, and participating in regular meetings.	(d)
3. Evaluating any ethical aspects of the project. The ethical aspects can include the perspectives of the designer and the user or affected parties, and knowledge of any applicable code of ethics, such as, the CIAPR, the IEEE or ACM Codes of Ethics.	(f)