

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

**Course Syllabus**

<b>1. General Information:</b>		
Alpha-numeric codification: INEL 4998 Course Title: UNDERGRADUATE RESEARCH Number of credits: 1 to 6 (Variable Credits) Contact Period: Three hours per credits each week. Elective in INEL		
<b>2. Course Description:</b>		
English: Participation in a research project under the supervision of a faculty member. Spanish: Participación en un proyecto de investigación bajo la supervisión de un profesor.		
<b>3. Pre/Co-requisites and other requirements:</b>		
Permission of the Director of the Department		
<b>4. Course Objectives:</b>		
During the course, all students are expected to: <ul style="list-style-type: none"> <li>• Gain experience in the research process.</li> <li>• Learn how to do literature review</li> <li>• Explore technologies related to the research topic.</li> </ul>		
<b>5. Instructional Strategies:</b>		
<input type="checkbox"/> conference <input type="checkbox"/> discussion <input type="checkbox"/> computation <input type="checkbox"/> laboratory  <input type="checkbox"/> seminar with formal presentation <input type="checkbox"/> seminar without formal presentation <input type="checkbox"/> workshop  <input type="checkbox"/> art workshop <input type="checkbox"/> practice <input type="checkbox"/> trip <input type="checkbox"/> thesis <input type="checkbox"/> special problems <input type="checkbox"/> tutoring  <input checked="" type="checkbox"/> research <input type="checkbox"/> other, please specify:		
<b>6. Minimum or Required Resources Available:</b>		
General Library, University Computer Centers, Laboratories, and any other necessary equipment related to the proposed research.		
<b>7. Course time frame and thematic outline</b>		
<b>Outline example for three credits</b>		<b>Contact Hours</b>
Literature Review		12
Laboratory work		30
Presentations or Publications		3
<b>Total hours: (equivalent to contact period)</b>		<b>45</b>
<b>8. Grading System</b>		
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable		
<b>9. Evaluation Strategies</b> (Suggested): The faculty member teaching the course will provide the student with the evaluation strategy he/she will be using throughout the semester. This will be done within the first week of classes.		
	<b>Quantity</b>	<b>Percent</b>
<input type="checkbox"/> Exams		

<input type="checkbox"/> Final Exam		
<input type="checkbox"/> Short Quizzes		
<input checked="" type="checkbox"/> Oral Reports	1	10
<input checked="" type="checkbox"/> Laboratory Report	4	40
<input type="checkbox"/> Assignment		
<input checked="" type="checkbox"/> Projects		
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: Implementation or Laboratory Work	1	50
<b>TOTAL:</b>		<b>100%</b>

### 10. Bibliography:

- Part of the problem solution is for the student to search the necessary reference materials. Library searches are encouraged.

### 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. Contribution of Course to meeting the requirements of Criterion 5:

Math	Basic Science	General	Engineering Topic
			√

### 13. Relationship of the course with program outcomes

#### Map to Program Outcomes

*All projects should satisfy a representative subset of the following outcomes:*

- 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)
- Developing and conducting the laboratory work or simulation or prototyping and troubleshooting where applicable. Results and data are correctly interpreted. (b)
- 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)
- Demonstrating an ability to organize the team assigning responsibilities, balancing the work load, and participating in regular meetings. (d)
- 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)
- 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)
- 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)
- Analyzing the social and environmental impact. The analysis may discuss economic implications, such as entrepreneurship potential, sustainability, usability, and employment substitutions. (h)
- 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)
- Discussing contemporary issues related to the project such as innovations, business opportunities, and local needs. (j)
- Making appropriate choice and use of specialized tools, software, or hardware to complete the design or to collect and analyze data. (k)

Person (s) who prepared this description and date of preparation. Academic Affairs Committee, April 10, 2008. Submitted by: Raúl E. Torres, Committee Coordinator, April, 2008.

