

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

Course Syllabus

1. General Information:	
Alpha-numeric codification: INEL 3115 Course Title: INTRODUCTION TO ELECTRICAL ENGINEERING Number of credits: 2 Contact Period: One two-hour laboratory per week. <u>Elective in INEL</u>	
2. Course Description:	
English: Basic concepts and applications on the specialization areas of electrical engineering and basic tools in preparation for the INEL courses. Experiments in the five specialization areas with experiences in design in control systems, communications, electronics, power, and applied electromagnetic. Other tools such as excel, power point and mat lab are also introduced.	
Spanish: Conceptos básicos y aplicaciones de las áreas de especialización en ingeniería eléctrica y herramientas básicas en preparación a los cursos de INEL. Experimentos en las cinco áreas de especialización con experiencia de diseño en aplicaciones de control, comunicaciones, electrónica, potencia y electromagnética aplicada. Otras herramientas como excell, power point y matlab son también introducidas.	
3. Pre/Co-requisites and other requirements:	
Pre-requisite: None.	
4. Course Goals:	
After Completing the course the student should have a clear idea of the curriculum and applications of the different specialization areas. Understanding of simple EE concepts and familiarization with measurement equipment is expected. It is expected that the students will learn the use of tools such as Matlab, Power Point, and Excel and be prepared to make an effective oral presentation.	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input type="checkbox"/> computation <input checked="" 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 checked="" type="checkbox"/> practice <input type="checkbox"/> trip <input type="checkbox"/> thesis <input type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify:	
6. Minimum or Required Resources Available:	
Accepted in EE program, limited space.	
7. Course time frame and thematic outline	
Outline	Contact Hours
Introduction to Electrical Engineering, Specialization areas, resources in	2

EE, undergraduate research opportunities, societies.	
Electrical Measurements Introduction, AC and DC, Voltage and Current, Ohms Law, Multimeter, Resistor's V-I curve, Excel. Oscilloscope, signal generator, frequency, sinusoidal wave.	2
Introduction to Matlab - The student will learn the basics of Matlab. This software is widely used in several EE courses. The software will be used in the course in several experiments.	2
Electronic Option – Discussion of applications and course in the specialization area. Audio amplifier implementation.	2
Communication and Digital Signal Processing (DSP) Option – Discussion of applications and courses in the specialization area. The student will learn the modulation techniques used in the communication systems to transmit signals in AM and FM. Single transmitter is implemented. Time and frequency domain is introduced using an MP3 file with an oscilloscope and a spectrum analyzer. The signal is filtered to observe frequency and time domain response. Compression techniques are also introduced. The student will observe how a digital signal is processed using an audio signal as an example. Students will process their own photographs using Matlab. Use of Cool Edit.	2
Applied Electromagnetics Option – Basic concept in transmitter/receiver is introduced (antennas, amplifiers, filters) Legacy of Maxwell equations. Simple experiments in propagation of electromagnetic waves are presented. A simple radar system using a network analyzer is also demonstrated and used to detect targets, measure range, and wave velocity. A time domain reflectometer using an oscilloscope is demonstrated and used to study the reflections in the transmission lines.	2
Control Systems Option - Discussion of applications and courses in the specialization area. Control experiments to be performed with Lego Robotics Kit. Different types of sensors are introduced. Robots are programmed to avoid obstacles and to follow reference trajectories.	2
Power Systems Option - Discussion of applications and courses in the specialization area. History of power generation in Puerto Rico. Basic house electric wiring diagram is presented. Source-line-load concepts. RMS, peak and average values. Power quality. A DC Motor-Generator system is presented to demonstrate the energy transformation and power generation. The generated DC current by the Motor-Generator system is transformed in AC current using a DC/AC inverter. Operation of a simple step-up and step-down transformer is also presented and used to power distribution. Experiment with low voltage lightbulb introducing different signals (frequency and shape) is presented.	2
Effective presentation using Power Point. Or Project	2
Project and Presentations.	2
Quizzes	10
Total hours: (equivalent to contact period)	30

8. Grading System

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies (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.

	Quantity	Percent
<input type="checkbox"/> Exams		
<input type="checkbox"/> Final Exam		
<input checked="" type="checkbox"/> Short Quizzes	10	30
<input checked="" type="checkbox"/> Oral Reports	5	20

<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	1	30
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: Homework	5	20
TOTAL:		100%

10. Bibliography:

Introduction to Electrical Engineering laboratory manual, Class Notes.

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. Course Outcomes

Map to Program Outcomes

- The student already makes established experiments in the manual of the course, and designs a project to finalize the course with all the tools obtained during the course. b
- The student analyze the behavior the collected data of different circuits, such as circuits series-parallel, different filters, etc., using computers tools. b
- Outside the laboratory they work in group when making the report of the respective practice. d
- The students during the laboratory will work in teams with attention to task distribution. d
- During the course the student makes written and oral reports, to state his understanding and control of the subject covered in each laboratory. g
- At the end of the course, each team will make one oral presentation of one of the course activities g
- The students use tools as computers software and learn to handle programs to analyze collected data and make reports. k
- The students will learn to use electrical engineering laboratory equipment k

Person(s) who prepared this description and date of preparation: Academic Affairs Committee April 2007, Submitted by: Raúl E. Torres, Committee Coordinator, Rev. May, 5, 08 Raúl E. Torres