

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 5205 Course Title: Instrumentation Number of credits: 3 Contact Period: 3 hours of lecture per week Elective in INEL		
<b>2. Course Description:</b>		
English: Signals from transducers; signal conditioning, data conversion and transmission; effects of noise. Data storage and display; use of microprocessors in instrumentation. Spanish: Transductores y sus señales; acondicionamiento de señales, transmisión y conversión de datos; efectos de ruido. Despliegue y almacenamiento de datos; uso de microprocesadores para instrumentación.		
<b>3. Pre/Co-requisites and other requirements:</b>		
INEL 4202 and INEL 4206		
<b>4. Course Objectives:</b>		
Understand the principles of operation of various types of transducers. Analyze and design signal conditioning and transmission circuits. Design and implement an electronic measuring instrument that meets a given a set of specifications.		
<b>5. Instructional Strategies:</b>		
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input checked="" 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 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:		
<b>6. Minimum or Required Resources Available:</b>		
Electronic measurement equipment, electronic components, data acquisition systems, personal computers.		
<b>7. Course time frame and thematic outline</b>		
<b>Outline</b>	<b>Contact Hours</b>	
Introduction	1	
Operational Amplifiers and Configurations	6	
Signal Conditioning Circuits	8	
Transducers (Temperature, displacement, pressure, flow, etc.)	15	
Shielding and Grounding Practices	3	
Optoelectronic devices	5	
Noise in Electronic Circuits	2	
Data Acquisition	3	
Exams	2	
<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 checked="" type="checkbox"/> <b>Exams</b>	<b>2</b>	<b>40</b>
<input checked="" type="checkbox"/> <b>Final Exam</b>	<b>1</b>	<b>20</b>
<input type="checkbox"/> <b>Short Quizzes</b>		
<input type="checkbox"/> <b>Oral Reports</b>		
<input type="checkbox"/> <b>Monographs</b>		
<input type="checkbox"/> <b>Portfolio</b>		

<input checked="" type="checkbox"/> <b>Projects</b>	<b>1</b>	<b>30</b>
<input type="checkbox"/> <b>Journals</b>		
<input checked="" type="checkbox"/> <b>Other, specify: Homework</b>	<b>Variable</b>	<b>10</b>
<b>TOTAL:</b>		<b>100%</b>

**10. Bibliography:**

K.R. Fowler, Electronic Instrument Design: Architecting for the Life Cycle, Oxford, 1996.  
 S. Franco, Design with Operational Amplifiers and Analog Integrated Circuits, McGraw-Hill, 1988.  
 J.W. Dally, W.F. Riley, and K.G. McConnelly, Instrumentation for Engineering Measurements, 2nd. Ed., John Wiley, 1993.

**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**

1. Understand the principles of operation of various types of transducers.
2. Analyze and design signal conditioning and transmission circuits.
3. Use modern engineering tools (MATLAB, LabVIEW, PSPICE...) for the design and implementation of an electronic instrument.
4. Design and implement an electronic measuring instrument that meets a given a set of specifications.
5. Preparation of an oral and written report about the final project.
6. Calibrate and test the instrument developed in class.
7. Work as part of a team.

**Map to Program Outcomes**

- (a)
- (e)
- (k)
- (c)
- (g)
- (b)
- (d)

Person(s) who prepared this description and date of preparation: Eduardo J. Juan, Submitted by: Eduardo J. Juan, December, 2006.