

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 4505 Course Title: Introduction to Control Systems Number of credits: 3 Contact Period: 3 hours of lecture per week Required in INEL		
2. Course Description:		
English: Analysis of control systems and their mathematical models; analysis and design of control systems for single-input single-output plants; computer solution of problems will be emphasized.		
Spanish: Análisis de sistemas de control y sus respectivos modelos matemáticos; análisis y diseño de sistemas de control para procesos de una sola entrada y salida; se enfatiza el uso de la computadora para la solución de problemas.		
3. Pre/Co-requisites and other requirements:		
INEL 4102		
4. Course Objectives:		
Analyze and design modern control systems.		
5. Instructional Strategies:		
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input checked="" 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 type="checkbox"/> research <input type="checkbox"/> other, please specify:		
6. Minimum or Required Resources Available:		
Classroom.		
7. Course time frame and thematic outline		
Outline	Contact Hours	
Basic definitions and classifications of control systems	3 lectures	
System representations: Block diagrams and signal flow graphs	3 lectures	
Mathematical models for translational and rotational mechanical systems and the DC motor.	5 lectures	
State variable description for dynamic linear systems.	2 lectures	
Control system characteristics: stability, steady state error, transient response, and disturbance rejection.	14 lectures	
The root locus method and its applications.	6 lectures	
Compensation methods using Bode plots and root locus	9 lectures	
Exams	3 lectures	
Total hours: (equivalent to contact period)	45	
8. Grading System		
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> 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 checked="" type="checkbox"/> Exams	3	55

<input checked="" type="checkbox"/> Final Exam	1	20
<input checked="" type="checkbox"/> Short Quizzes	Variable	10
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	1	15
<input type="checkbox"/> Journals		
<input type="checkbox"/> Other, specify:		
TOTAL:		100%

10. Bibliography:

N.S. Nise, "Control Systems", 5th Edition, John Wiley & Sons.

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
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13. Course Outcomes

1. Use of the Laplace transform to model mechanical, electrical and electromechanical systems.
2. Analyze the performance of a closed-loop, single input, single output control system.
3. Design controllers to improve the transient, steady-state and stability characteristics of control systems.

Map to Program Outcomes

- (a)
(a)
(c)

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