

University of Puerto Rico
 Mayagüez Campus
 College of Engineering
 Department of Electrical and Computer Engineering
 Graduate Program in Electrical Engineering

Course Syllabus

1. General Information:	
Alpha-numeric codification: INEL 6028	
Course Title: OPTIMIZATION AND ECONOMIC OPERATION OF INTEGRATED POWER SYSTEMS	
Number of credits: 3	
Contact Period: 3 hours of lecture per week	
2. Course Description:	
English: Theory of Optimization Under Equality and Inequality Constraints; computational Methods and Application to Generation Scheduling in Intergrated Power Systems.	
Spanish: Teoría de Optimización Bajo Condiciones de Igualdad y Desigualdad; Métodos Computacionales y Su Aplicación Al itinerario de Generación en Sistemas Integrados de Potencia Eléctrica.	
3. Pre/Co-requisites and other requirements:	
Pre- Inel 4415 or equivalent	
4. Course Objectives:	
Explain modern power system operation and control issues. Apply optimization methods to solve unit commitment, generation control, energy interchange, state estimation, optimal power flow, security assessment, and emergency operation problems in power systems.	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input checked="" type="checkbox"/> computation <input type="checkbox"/> laboratory <input checked="" 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 checked="" 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:	
Standard lecturing facilities. Standard software for power systems analysis.	
7. Course time frame and thematic outline	
Outline	Contact Hours
Overview of Power Systems Operation and Control	3
Mathematical Background	4.5
Unit Commitment	4.5
Control of Generation	4.5
Interchange of Power and Energy	4.5
State Estimation	6
Optimal Power Flow	6
Power System Security	6
Emergency Operations	6

Total hours: (equivalent to contact period)	45
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8. Grading System

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	2	50%
<input type="checkbox"/> Final Exam		
<input checked="" type="checkbox"/> Short Quizzes	Several	15%
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographs		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	1	20%
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: homework	Several	15%
TOTAL:		100%

10. Bibliography:

1. Allen J. Wood and Bruce F. Wollenberg, "Power Generation, Operation, and Control", John Wiley and Sons, Second Edition, 1996. (Classic textbook in the area)
2. P. Venkataraman, "Applied Optimization with MATLAB Programming", John Wiley & Sons, 2002.
3. S. A. Soman, S. A. Khaparde, and S. Pandit, "Computational Methods for Large Sparse Power Systems Analysis: An Object Oriented Approach", Kluwer Academic Publishers, 2002.
4. M. Crow, "Computational Methods for Electric Power Systems", CRC Press, 2003.
5. Abur and A. Gómez Expósito, "Power System State Estimation: Theory and Implementation", Marcel Dekker, 2004.
6. U. G. Knight, "Power Systems in Emergencies: From Contingency Planning to Crisis Management", John Wiley & Sons, 2001.
7. M. M. Adibi, "Power System Restoration: Methodologies and Implementation Strategies", IEEE Press, 2000.

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.

Person who prepared this description and date of preparation:

José R. Cedeño, August 2007