

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 6026	
Course Title: COMPUTATIONAL METHODS FOR POWER SYSTEMS ANALYSIS II	
Number of credits: 3	
Contact Period: 3 hours of lecture per week	
2. Course Description:	
English: Application of Numerical Techniques and Computer Methods to The Solution of A Variety of Problems Related to The Planning, Design and Operation of Large Interconnected Electric Power Systems.	
Spanish: La Aplicacion de Tecnicas de Analisis Numéricos y el Uso De computadoras Electrónicas en la Solución de Problemas Relacionados Con la Planificación, el Diseño y la Operación de Sistemas Eléctricos Interconectados.	
3. Pre/Co-requisites and other requirements:	
4. Course Objectives:	
Apply different evolutionary computation (EC) techniques to the solution of a variety of problems related to the planning, design and operation of large interconnected electric power systems. Implement various evolutionary computation algorithms. Discuss tradeoffs between different evolutionary algorithms and other optimization methods. Discuss issues related to the application and performance evaluation of evolutionary algorithms.	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input checked="" 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 type="checkbox"/> research <input type="checkbox"/> other, please specify:	
6. Minimum or Required Resources Available:	
Standard lecturing facilities and MATLAB software.	
7. Course time frame and thematic outline	
Outline	Contact Hours
Overview of Optimization	3
Introduction to Evolutionary Computation	3
Evolutionary Programming	3
Evolution Strategies	3
Differential Evolution	3

Particle Swarm Optimization	3
Ant Colony Search	3
Constraint Handling Techniques	3
Multi-Objective Optimization	3
Design Considerations	3
Advanced Topics	9
Project Presentations	6
Total hours: (equivalent to contact period)	45

8. Grading System

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	1	15%
<input type="checkbox"/> Final Exam		
<input type="checkbox"/> Short Quizzes		
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects		15%
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: homework articles review and critiques, term paper		70%
TOTAL:		100%

10. Bibliography:

1. D. Dumitrescu, "Evolutionary Computation", CRC Press, 2000.
2. T. Bäck, D.B. Fogel, and T. Michalewicz (Editors), "Evolutionary Computation 1: Basic Algorithms and Operators", Institute of Physics Publishing, 2000.
3. T. Bäck, D.B. Fogel, and T. Michalewicz (Editors), "Evolutionary Computation 2: Advanced Algorithms and Operators", Institute of Physics Publishing, 2000.
4. Ruhul Sarker, Masoud Mohammadian, and Xin Yao, Evolutionary Optimization, Springer, 2002.
5. J.A. Momoh, Electric Power System Applications of Optimization, CRC Press, 2001.

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.