Course Unit Description - (OMDSE)

(Optimization and Decision Methods in Power Systems)

(Mestrado em Engenharia Electrotécnica - Sistemas Eléctricos de Energia)

Academic year: 2009/2010

Subject group: Sistemas de Energia

	Semestral	**Compulsory**	
Mode of study	Diurno	**Hours/Week**	**T-**Teórica
Year	1º		**PL-**Prática-Laboratorial
Semester	1º		**OT-**Orientação Tutorial

ECTS 7.5

Objectives

General Objectives:
The student should:
• Recognise a Optimization Problem.
• Know the main optimization problems solving methods, specificaly in the área of Linear and non-linear programing, MethaHeuristics, Evolutionary Progra
Artificial Inteligence.
• Know, formulate and identify solutions for the main optimization problems in the Electric Power Systems
Specific Objectives:
The student should:
• When in an Electric Power System Organization, identify issues for optimization.
• When facing a optimization problem identify the requirements the their solving and resolution.
• After the problem formulation chouse an adequate optimization method and coordenate the implementation of the solving tool.

Course Contents

1. Optimization
1.1. Optimization problems – definition and characterization
1.2. Linear and Non-Linear Optimization
1.3. Problems Classes
2. Resolution Methods of Combinatorial Optimization Problems
2.1. Simplex Method
2.2. “Branch and Bound”
2.3. Meta Heuristics
2.4. Evolutionary Computing
2.5. Artificial Intelligence Methods
3. Power Systems Optimization Problems Solving Methods
3.1. The unit commitment problem
3.2. The production scheduling problem
3.3. The maintenance scheduling problem
3.4. Power system planning
3.5. Optimal power flow problem

Recommended reading

Corne, D., Dorigo, M. e Glover, F., New Ideas in Optimisation, McGraw-Hill, 1999
Kennedy, J., Eberhart, R.. e Shi, Yuhui, Swarm Intelligence, Morgan Kaufmann/ Academic Press, 2001.
Ribeiro, Celso C., e Jansen, Pierre, Essays and Surveys in Metaheuristics, Kluwer Academic Publishers, 2001.
B.H. Chowdhury, S. Rahman, A Review of Recent Advances in Economic Dispatch, IEEE
Transactions on Power Systems, Vol. 5, No. 4, 1990.
J. K. Delson M. Shahidehpour, Linear Programming Applications To Power System Economics, Planning, And Operations, IEEE Transactions on Power Syste
3, Pp. 1155–1163, 1992.
Y. Fu, M. Shahidehpour, Z. Li, Security-Constrained Unit Commitment With AC Constraints,
IEEE Transactions On Power Systems, Vol. 20, No. 3, 2005.
Hobbs, B. F., Rothkopf, M. H.,
O''Neill, R. P., Anc
(Eds.), The Next Generation Of
Electric Power Unit Commitment Models, Kluwer Academic Press, 2001.
N. P. Padhy, Unit Commitment—A Bibliographical Survey, IEEE Transactions on Power
Systems, Vol. 19, No. 2, May 2004.

Teaching Methods

Case presentation and solving
Discussion
Autonomous Work Development
Development of laboratory projects
Several activities, such as: reading, analysis and commentary of references concerning the course contents; presentation of cases and computer applicati
participation in talks and demonstration sessions.

Assessment methods

The final classification of the discipline depends of two components. One component (NFREQ) results from the average classification of two practical Work
respectively 30% and 70%. The works are developed in group and are compulsory for all students. The minimum classification for each component is 10.
The second component (PE) consist of an exam. The minimum classification for this component is 7,5.
The final classification can be calculated using the following formula.

Final Classification= 0,3*PE + 0,7*NFREQ

	Name
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Lecturer:	Ana Maria Dias Madureira Pereira (AMD) Maria Eduarda da Cunha e Silva Pinto Ferreira (EPF) Maria Teresa do Valle Moura Costa (MCO) Nuno Filipe da Fonseca Bastos Gomes (NBG)