

Course Unit Description - (SISEE)

(Intelligent Systems in Power Systems)

(Mestrado em Engenharia Electrotécnica - Sistemas Eléctricos de Energia)

Academic year: 2009/2010

Subject group: Sistemas de Energia

	Semestral	Optional	
Mode of study	Diurno	Hours/Week	T-Teórica 2
Year	1 ^o		PL-Prática-Laboratorial 2
Semester	2 ^o		OT-Orientação Tutorial 2
ECTS	7.5		

Objectives

It is envisaged that the students understand Artificial Intelligence (AI) concepts and are able to evaluate the opportunity of using AI techniques to solve power systems (PS) and Electricity Markets.

Course Contents

Artificial Intelligence – an introduction
Knowledge-based systems (KBS): Expert Systems; Intelligent Tutors; Uncertainty reasoning; Fuzzy Logic; KBS Applications to Power Systems and Electricity Markets
Problem Solving and Metaheuristics: Branch & Bound; A*; Tabu Search; Simulated Annealing; Genetic Algorithms; Swarm Intelligence; Ant Colony Algorithms
Machine Learning: Artificial Neural Networks; Case-based Reasoning; Data Mining and Knowledge Discovery; Application of Machine Learning to Power Systems and Electricity Markets
Agents: Agents' characteristics; Agent Negotiation; Agent applications in Power Systems and Electricity Markets

Recommended reading

- J. Arrillaga, "Computer Modelling of Electrical Power Systems", John Wiley & Sons, 2001
 - R. Natarajan, "Computer Aided Power System Analysis", Marcel Dekker, 2002
 - C. Leondes (Editor), Intelligent Systems – Technology and Applications - vol. VI: Control and Electric Power Systems, CRC Press, 2003
 - Zita A. Vale, Intelligent Power System, In "Encyclopedia of Computer Science and Engineering", 5-Volume set (ISBN 978-0-471-38393-2), Benjamin W. Wah, Editor, Wiley, Hoboken, NJ, 2009
- Some journals:
- . IEEE Computer Applications in Power (1988 to 2002)
 - . IEEE Power & Energy Magazine (from January 2003)
 - . IEEE Transactions in Power Systems
 - . IEEE Transactions in Power Delivery
 - . Other available references, namely in the electronic library b-on

Teaching Methods

Case presentation and solving
Discussion
Autonomous Work Development
Development of computer applications and software packages use to solve power system problems
Several activities, such as: reading, analysis and commentary of references concerning the course contents; presentation of computer applications; participation and demonstration sessions.

Assessment methods

C1 – assessment of students' performance in the course activities: class activities performance, autonomous and group work, 80% (C1 at least equal to 10 in 20)
C2 - 1 written test, 20% (C2 at least equal to 10 in 20)

Students with C1 or C2 lower than 10 (in 20) do not obtain approval in this course.

	Name
Teacher responsible:	Zita Maria Almeida do Vale (ZAV)

Lecturer:

Zita Maria Almeida do Vale (ZAV)
Antonio Pinto de Sousa e Silva (ASS)
Filipe Miguel Tavares de Azevedo (FTA)

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