Guia docent
220044 - OIP - Optimització de Processos Industrials

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Unitat responsable: Escola Superior d'Enginyeries Industrial, Aeroespacial i Audiovisual de Terrassa
Unitat que imparteix: 707 - ESAII - Departament d'Enginyeria de Sistemes, Automàtica i Informàtica Industrial.

Titulació: GRAU EN ENGINYERIA EN TECNOLOGIES AEROESPACIALS (Pla 2010). (Assignatura optativa).
GRAU EN ENGINYERIA EN TECNOLOGIES INDUSTRIALS (Pla 2010). (Assignatura optativa).
GRAU EN ENGINYERIA EN VEHICLES AEROESPACIALS (Pla 2010). (Assignatura optativa).

Curs: 2023 **Crèdits ECTS:** 3.0 **Idiomes:** Anglès

PROFESSORAT

Professorat responsable: ANTONIO GUASCH PETIT

Altres: VICENÇ PUIG CAYUELA - JAUME FIGUERAS JOVE

METODOLOGIES DOCENTS

The course is developed by the use of:

- Lecture sessions.
- Problem-solving classes (case studies and exercises).
- Self-study which includes exercises and activities.
- A project

OBJECTIUS D'APRENENTATGE DE L'ASSIGNATURA

Optimization is the art and science of allocating scarce resources to the best possible effect. Optimization techniques are called into play every day in industrial planning problems, industrial design, resource allocation, scheduling, decision-making, etc. For example: how does an airliner know how to route its planes and schedule its crews at minimum cost; while meeting constraints on airplane flight hours between maintenance and maximum flight time for crews? Another example could be how to schedule body cars into a painting line such as the planned production can be achieved?

The main goals of this course will be:

1. recognize problems that can be tackled using the tools of applied optimization,
2. formulate optimization problems correctly and appropriately,
3. solve optimization problems, primarily by selecting and applying the correct solvers.

These abilities will be especially useful as the world becomes more complex and computer-focused.

HORES TOTALS DE DEDICACIÓ DE L'ESTUDIANTAT

Tipus	Hores	Percentatge
Hores aprenentatge autònom	45,0	60.00
Hores grup gran	30,0	40.00

Dedicació total: 75 h

CONTINGUTS

Introduction to Optimization of Industrial Processes

Descripció:
Optimization application areas. Introduction to methods, models and tools for the optimization of industrial processes.

Dedicació: 15h
Grup gran/Teoria: 5h
Aprenentatge autònom: 10h

Introduction to the AMPL mathematical programming language

Descripció:
AMPL (A Mathematical Programming Language) is an algebraic modeling language to describe and solve high-complexity problems for large-scale mathematical computing (i.e., large-scale optimization and scheduling-type problems). The AMPL basic programming structures will be analyzed using optimization problems.

Dedicació: 25h
Grup gran/Teoria: 10h
Aprenentatge autònom: 15h

Modeling and optimitzation of industrial processes

Descripció:
Explores a variety of models for the solution of airline, supply chain, transportation and manufacturing optimization problems.

Dedicació: 35h
Grup gran/Teoria: 15h
Aprenentatge autònom: 20h

SISTEMA DE QUALIFICACIÓ

The final grade depends on the following evaluation criteria

Nfinal = 0.4*Ex + 0.35*Pr + 0.25*Cl

- Ex: individual and group exercises
- Pr: group project
- Cl: participation in class activities

BIBLIOGRAFIA

Bàsica:
- Bazargan, Massoud. Airline operations and scheduling [en línia]. 2nd ed. London: Routledge, 2016 [Consulta: 10/06/2022]. Disponible a: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=554559. ISBN 9786612657580.

Complementària:
- Shapiro, Jeremy F. Modeling the supply chain. 2nd ed. Belmont: Thomson Brooks/Cole, 2007. ISBN 049512611X.