

# GIMAS7AE ALGORITHMS APPLIED TO INDUSTRIAL ENGINEERING

GIMAS7AE		ECTS Credits: 2	Semester: S7
Algorithms applied to Industrial Engineering		Duration: 21 hours	
Person(s) in charge:			
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Keywords: computational complexity, optimization, data structure, algorithm			
Prerequisites: None			
Objective:			
Create a complete application for a serious optimization problem			
Program and Contents:			
<b>Objectives</b> The aim of this course is to introduce the basics in information systems necessary for developing standard industrial engineering applications. Informatics is a major component in this sector and should not be underestimated. The "ready-made" software tools currently available cover all the subfields in industrial engineering, but they are still not sufficient enough and specific applications often need to be developed. An industrial engineer can not just be an end-user. He must also know how to create and develop application software.			
<b>Content</b> At the beginning of each class there will be a short presentation of the principles and concepts which will then be applied during the practical work period. According to the students' needs, further explanations (for example, how to quickly access the minimum of an ensemble: discovery of the Priority Queue) can be given at any moment.  Aim: create a complete application for a serious optimisation problem (a travelling salesman under certain constraints, for example). Several approaches are possible:  A direct method counterbalancing an empiricism based on experience and a metaheuristic to choose between a "simulated annealing" and a genetic algorithm. This practical work will be the object of a demonstration and a report. The development tool can be either Visual Basic.net or VBA Excel. Scientific publications can be used to help with ideas or methods. Students must show autonomy and imagination.			
<b>Assessment methods</b>  A software project completed over one semester with a report and a demonstration on a machine. The project is based on a difficult problem in discrete optimisation. It is to be carried out using several methods.			
Abilities:			
Levels	Description and operational verbs		
Know			
Understand			
Apply			
Analyze			
Summarise			
Assess			
Evaluation:			

<input type="checkbox"/> Written test	<input type="checkbox"/> Continuous Control	<input type="checkbox"/> Oral report	<input checked="" type="checkbox"/> Project	<input checked="" type="checkbox"/> Written report
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