



Programme of Module "Process and Operations Scheduling"

- Code: DT0219
- Type of course unit: Compulsory (Master Degree in Mathematical Engineering curriculum Comune)
- Level of course unit: Postgraduate Degrees
- Semester: 1

Number of ects credits: (Master Degree in Mathematical Engineering) 6 (workload 150 hours)

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1	<b>Course objectives</b>	Train the students in recognizing machine scheduling problems, classify them in terms of computational complexity and solve them by heuristic, approximation or exact algorithms.
2	<b>Course content and learning outcomes (dublin descriptors)</b>	<p>Topics of the module include:</p> <ul style="list-style-type: none"> <li>• Elements of a (deterministic) scheduling problem, examples of practical applications</li> <li>• Classification of scheduling problems</li> <li>• Integer Linear Programming formulations</li> <li>• Single machine scheduling: computational complexity, heuristic and exact algorithms</li> <li>• Parallel machine scheduling: exact, heuristic and approximation algorithms</li> <li>• Relationships with basic Combinatorial Optimization problems</li> <li>• Optimization problems in Project Scheduling</li> <li>• Job Shop scheduling: formulations, heuristic and exact algorithms</li> </ul> <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> <li>• Acquire knowledge of Machine Scheduling problems, their classification in terms of computational complexity and algorithmic techniques developed for their solution. Acquire the fundamentals of optimization methods for project management.</li> <li>• Acquire the ability to recognize Machine Scheduling problems in different application contexts, such as computer science, industrial engineering and management, and to identify effective solution paradigms.</li> <li>• Acquire autonomy in modeling and algorithmic choices for complex problems related to scheduling and project management.</li> <li>• Being able to hold a conversation and to read texts on topics related to the modeling of scheduling problems and the evaluation of algorithms for their solution</li> <li>• Acquire skills upgrading flexible knowledge and skills in the field of scheduling problems that arise in various areas, such as computer science, industrial engineering and management</li> </ul>
3	<b>Course prerequisites</b>	basic elements of computational complexity, linear programming and network flows
4	<b>Teaching methods and language</b>	<p>standard lessons and exercise sessions</p> <p><b>Language:</b> English</p> <p><b>Reference textbooks</b></p> <ul style="list-style-type: none"> <li>• Michael Pinedo, <i>Scheduling Theory, Algorithms, and Systems</i>. Prentice Hall.</li> </ul>
5	<b>Assessment methods</b>	a paper test concerning with theoretical or computational exercises; an oral test, accessible only with a sufficient grade at the paper test, about general machine scheduling theoretical issues