



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)

Teachers: Stefano Smriglio (Stefano.Smriglio@univaq.it)

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| 1 | Course objectives | 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 | Course content and learning outcomes (dublin descriptors) | <p>Topics of the module include:</p> <ul style="list-style-type: none"> • Elements of a (deterministic) scheduling problem, examples of practical applications • Classification of scheduling problems • Integer Linear Programming formulations • Single machine scheduling: computational complexity, heuristic and exact algorithms • Parallel machine scheduling: exact, heuristic and approximation algorithms • Relationships with basic Combinatorial Optimization problems • Optimization problems in Project Scheduling • Job Shop scheduling: formulations, heuristic and exact algorithms <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> • 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. • 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. • Acquire autonomy in modeling and algorithmic choices for complex problems related to scheduling and project management. • 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 • 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 |
| 3 | Course prerequisites | basic elements of computational complexity, linear programming and network flows |
| 4 | Teaching methods and language | <p>standard lessons and exercise sessions</p> <p>Language: English</p> <p>Reference textbooks</p> <ul style="list-style-type: none"> • Michael Pinedo, <i>Scheduling Theory, Algorithms, and Systems</i>. Prentice Hall. |
| 5 | Assessment methods | 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 |