



Programme of Course "Big Data: Models And Algorithms"

- Code: DT0317
- Type of course unit: Elective (Master Degree in Computer Science curriculum NEDAS)
- Level of course unit: Postgraduate Degrees
- Semester: 2

Number of ects credits: (Master Degree in Computer Science) 3 (workload 75 hours)

Teachers: Mattia D'Emidio (mattia.demidio@univaq.it)

1	Course objectives	Upon completion of this course the student will have reliably demonstrated the ability to design, analyze and implement algorithms for massive data sets using state-of-the-art algorithmic techniques in the area. Furthermore, the student will be able to understand: i) storage strategies that are suited for large-scale datasets (e.g. distributed, unstructured); ii) alternative processing models that are relevant to big data; iii) fundamentals of large-scale data mining. Finally, the student will acquire basic knowledge of experimental algorithmic techniques and data analysis.
2	Course content and learning outcomes (dublin descriptors)	<p>Topics of the module include:</p> <ul style="list-style-type: none"> • Data Mining • Algorithmic techniques, storage frameworks, processing models for massive data sets • Experimental algorithmics <p>On successful completion of this module, the student should :</p> <ul style="list-style-type: none"> • Understand the challenges of large scale data mining • Be able to describe in a comprehensible manner, analyze, evaluate, and compare the performance of algorithms, with a focus on models of computation relevant to massive data sets • Be able to design and implement algorithms for computational problems at large scale through state-of-the-art techniques • Be able to lookup and apply relevant research literature for problems related to storage and processing of massive data sets • Be able to express oneself in writing at scientific level • Know the foundations of the algorithmic experimental process design
3	Course prerequisites	Basic courses on design and analysis of algorithms and data structures. Mathematical and programming maturity. Fundamentals of data analysis.
4	Teaching methods and language	<p>Frontal Instruction + Active/Cooperative Learning</p> <p>Language: English</p> <p>Reference textbooks</p> <ul style="list-style-type: none"> • Catherine McGeoch, <i>A Guide to Experimental Algorithmics</i>. • J. Leskovec, A. Rajaraman, J. D. Ullman, <i>Mining of Massive Datasets. 2nd Edition</i>.
5	Assessment methods	Written Exam + Oral discussion (and/or Homework/Project)