

## **Optimization Techniques (62104)**

**Instructors: A.YANNACOPOULOS**

Core Course, 2<sup>nd</sup> semester, 5 ECTS units

Course level: Graduate (MSc)

Language: Greek

### **Course Description**

The course introduces the basic concepts and techniques of Optimization theory with an emphasis on applications in various fields such as e.g. statistics, machine learning, finance etc.

Techniques are covered from convex optimization, duality methods, stochastic optimization, non smooth programming as well as computational algorithms such as e.g. gradient methods, stochastic gradient schemes, Newton and quasi Newton schemes etc.

### **Prerequisites**

None.

### **Target Learning Outcomes**

Upon successful completion of the course, students will learn the fundamental concepts and techniques of the theory of Optimization and they will be able to apply these techniques in the context of problems in Statistics.

### **Recommended Bibliography**

- S. Boyd and Vanderberghe, Convex optimization, Cambridge University Press
- J. Nocedal, Numerical Optimization, Springer.
- D. Kravvaritis and A. N. Yannacopoulos, Variational Methods in Nonlinear Analysis with applications in Optimization and PDEs. De Gruyter, Chapters 4 and 5.
- A. N. Γιαννακόπουλος, Βελτιστοποίηση και εφαρμογές, Σημειώσεις μαθήματος

### **Teaching and Learning Activities**

In vivo or by distance teaching, computational applications.

### **Assessment and Grading Methods**

Essays and mini projects within the term.