

Optimization Techniques in Data Analytics (m62113p)

Instructors: *A. YANNACOPOULOS*

Core Course, 2nd semester, 5 ECTS units

Course level: Graduate (MSc)

Language: Greek Greek (or English if foreign students attend)

Course Description

The course introduces the basic concepts and analytic and computational techniques of Optimization theory with an emphasis in data analytics and machine learning and its applications in various fields covered in the present MSc.

Techniques are covered from linear and integer programming, 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. with applications in concrete models in data science.

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 data science.

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.