



University of Pretoria Yearbook 2016

Mathematical optimisation 750 (WTW 750)

Qualification Postgraduate

Faculty [Faculty of Natural and Agricultural Sciences](#)

Module credits 15.00

Programmes [BScHons Applied Mathematics](#)

[BScHons Financial Engineering](#)

[BScHons Mathematics of Finance](#)

Prerequisites Multivariate Calculus on 2nd-year level; Linear Algebra on 2nd-year level

Contact time 2 lectures per week

Language of tuition English

Academic organisation Mathematics and Applied Maths

Period of presentation Semester 1

Module content

Classical optimisation: Necessary and sufficient conditions for local minima. Equality constraints and Lagrange multipliers. Inequality constraints and the Kuhn-Tucker conditions. Application of saddle point theorems to the solutions of the dual problem. One-dimensional search techniques. Gradient methods for unconstrained optimisation. Quadratically terminating search algorithms. The conjugate gradient method. Fletcher-Reeves. Second order variable metric methods: DFP and BFGS. Boundary following and penalty function methods for constrained problems. Modern multiplier methods and sequential quadratic programming methods. Practical design optimisation project.

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