

Title <b>Optimization Methods</b>	Code <b>POZ04WTS2ICC20</b>
Field <b>Electronics and Telecommunications</b>	Year / Semester <b>2 / autumn</b>
Specialty	Course <b>core</b>
Hours / week Lectures: <b>1</b> Classes: <b>1</b> Laboratory: -      Projects / seminars: -	Number of credits <b>2</b>

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**Status of the course in the study program:**

Obligatory course for students of Electronics and Telecommunications.

**Objectives of the course:**

Introduction to engineering optimization from the application perspective. The goal is to learn how to use available optimization methods and the respective software modules

**Course description:**

Optimization problems with examples. Single-variable optimization, Extreme points of multivariable functions.

Linear programming, standard form of a linear programming problem, simplex method.

Unconstrained nonlinear optimization. Direct search methods: random search, univariate methods, Powell method. Descent methods: Newton method, Marquardt method, quasi-Newton methods, Davidon-Fletcher-Powell method.

Constrained optimization: Lagrange multiplier method, penalty function methods.

Dynamic programming and Bellman principle.

Integer programming.

The lecture is accompanied by lab classes using Matlab-based optimization software package.

**Prerequisite:**

Mathematics: matrices and vectors, systems of linear equations and their solutions, systems of linear inequalities, nonlinear inequalities, derivatives and integrals, linear and nonlinear multivariable functions, convex and concave functions.

**Teaching methods:**

Lectures, laboratory work

**Assessment methods:**

Written tests, solution of problems, oral explanation.

**Bibliography:**

1. S. Rao, *Engineering optimization*, Wiley, 2009.
2. A. Ravindran, K. Ragsdell, G. Reklaitis, *Engineering optimization*, Wiley, 2006.