Complex exam major subject	System and process optimization in engineering
Syllabus	Problem formulation, identification of design variables, optimization criteria and constraints. Systematic consideration of alternatives, while satisfying resource and cost constraints. Finding appropriate cost function. Verification by experiments. Linear, nonlinear, integer and stochastic programming, discrete optimization, optimal control, multi-objective (multi-criterion) optimization. Large and complex systems, multidisciplinary design optimization. Sensitivity analysis task size reduction. Robust design. Application of modern (non-traditional) optimization methods for solving complex engineering optimization problems (genetic algorithms, simulated annealing, particle swarm optimization, ant colony optimization, neural network-based optimization, fuzzy optimization), comparison of the efficiency of the methods, finding the best method. Optimization of products and production processes. Shape optimization, topology optimization.

Bibliography

1. Iqbal, K., *Fundamental Engineering Optimization Methods*, Bookboon.com, 2013
2. Körtélyesi, G., (ed), *Engineering Optimization*, Typotex, 2012, www.tankonyvtar.hu
3. Singiresu S. Rao, *Engineering Optimization – Theory and Practice*, John Wiley & Sons, Inc., 2009
4. Sobieszczanski-Sobieski, J., Morris, A., Tooren, M.J.L., *Multidisciplinary Design Optimization Supported by Knowledge Based Engineering*, John Wiley & Sons, Ltd., 2015

Compulsory subjects for this minor subject	Advanced signal processing methods in technical diagnostics
Recommended subjects for this minor subject	