

Course: Telecommunication Network Design  
Teachers: Andrzej Kamisiński (andrzejk@agh.edu.pl)  
Studies: Electronics and Telecommunications  
Speciality: Networks and Services  
Semester: 2<sup>nd</sup> sem. MSc stud., Fall

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## Preparation to the laboratory classes

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### Examples of typical optimization problems modeled with CPLEX/OPL (2017-11-20)

Information about quizzes:

- we are going to use the TCEXAM system that is available as the `exam` bootable image,
- if possible, please verify your login credentials before the class (<http://exam.kt.agh.edu.pl/>) — you can access the system only from the laboratory network.

### Scope of the quiz at the beginning of the class

You should be familiarized with the material presented during the following lectures:

- Lecture 1: *Basics of graph theory.*
- Lecture 2: *Algorithms defined on graphs.*
- Lecture 3: *Shortest paths in graphs.*
- Lecture 4: *Graph modeling of networks.*
- Lecture 5: *Network design based on mathematical programming — introduction.*

### How to prepare to the class

You should revise the following optimization problems defined on graphs:

- minimum spanning tree,
- maximum flow,
- minimum cut,
- vertex coloring,
- shortest path,

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and then attempt to model them using linear programming (LP) or mixed integer linear programming (MILP) techniques. The related problem formulations are provided in a concise mathematical form in the following research paper: LiYing Cui, Soundar Kumara, and Réka Albert. Complex Networks: An Engineering View. *IEEE Circuits and Systems Magazine*, 10(3):10?25, third quarter 2010.