# *Network Optimization Methods*

Laurea Magistrale in Computer Science and Networking
Febbraio 2019

# *Info on the course*

*Titolo: Metodi di ottimizzazione delle reti*

*Title: Network optimization methods*

- 6 CFU
- Second semester

*Teacher: Maria Grazia Scutellà*

*Area: Applied Mathematics*

- Operations Research (MAT/09)

*Topic: Modeling and optimization methods for Communication Networks*

# *A short presentation*

*Motivation:* Modeling and design of large communication networks is an important area to researchers and practitioners

*Network design:* optimal determination of

- capacity of links and nodes
- traffic routing

taking into account different network states (e.g. failures)

# *Currently*

*Still* a large gap between what is achievable through mathematical models and optimization methods and what is used in practice

*Objective:* we'll try to close this gap

# *Purpose of the course*

*To present basic principles and methods for network design*

- mathematical formulations to state problems in a formal way (Integer Linear Programming)
- efficient optimization methods (often based on flow algorithms)

# *Programme*

*Models and algorithms to:*

- basic network flow problems (minimum cost flow, multicommodity flows)
- network design problems (including routing, capacity design, resiliency and robustness)

*Background in:* calculus and linear algebra on an undergraduate degree in electrical engineering or computer science (and, hopefully, Linear Programming ...)

More details in:

http://didawiki.cli.di.unipi.it/doku.php/magistraleinformaticanetworking/mor/start