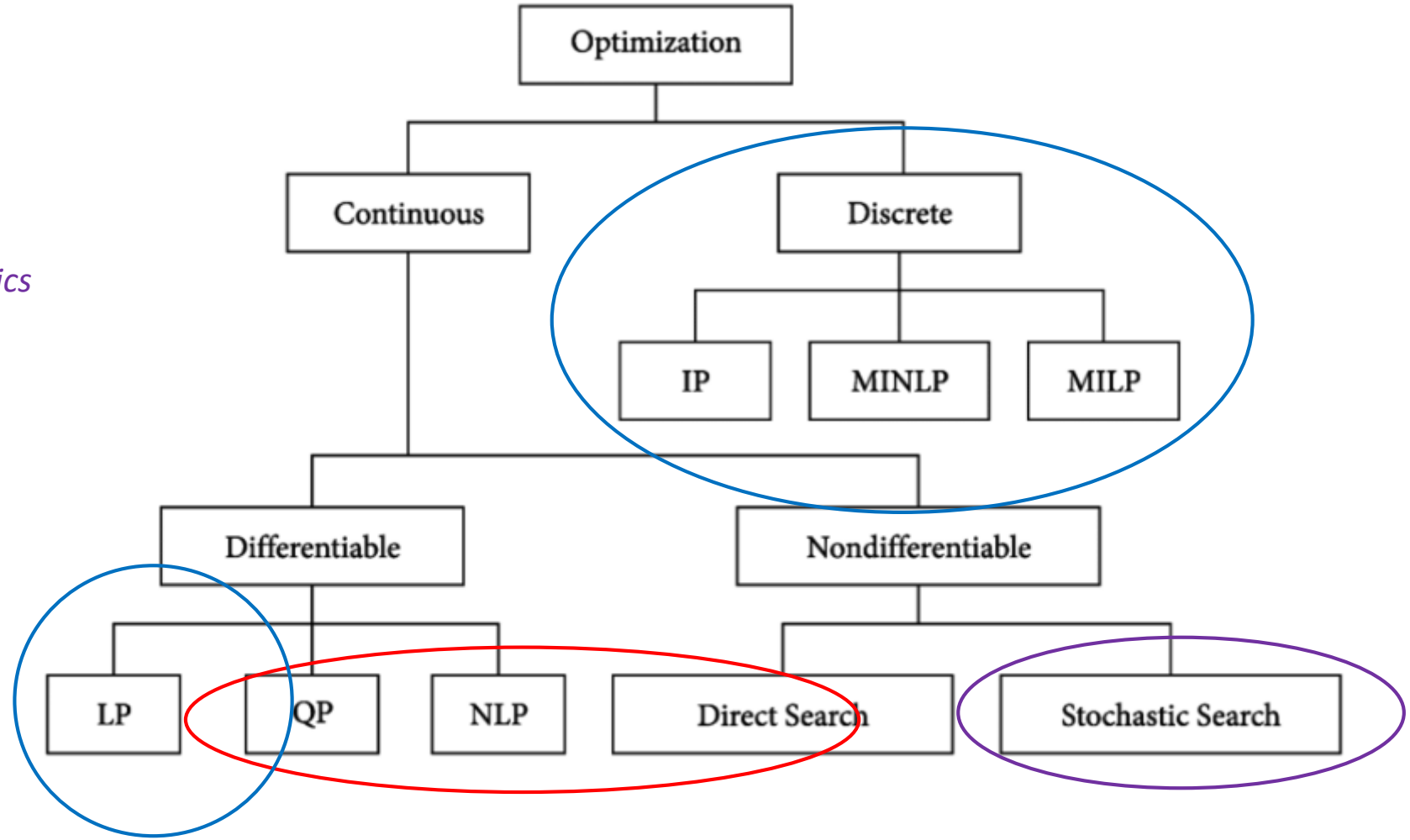
TIES483 Nonlinear optimization

Wrap up

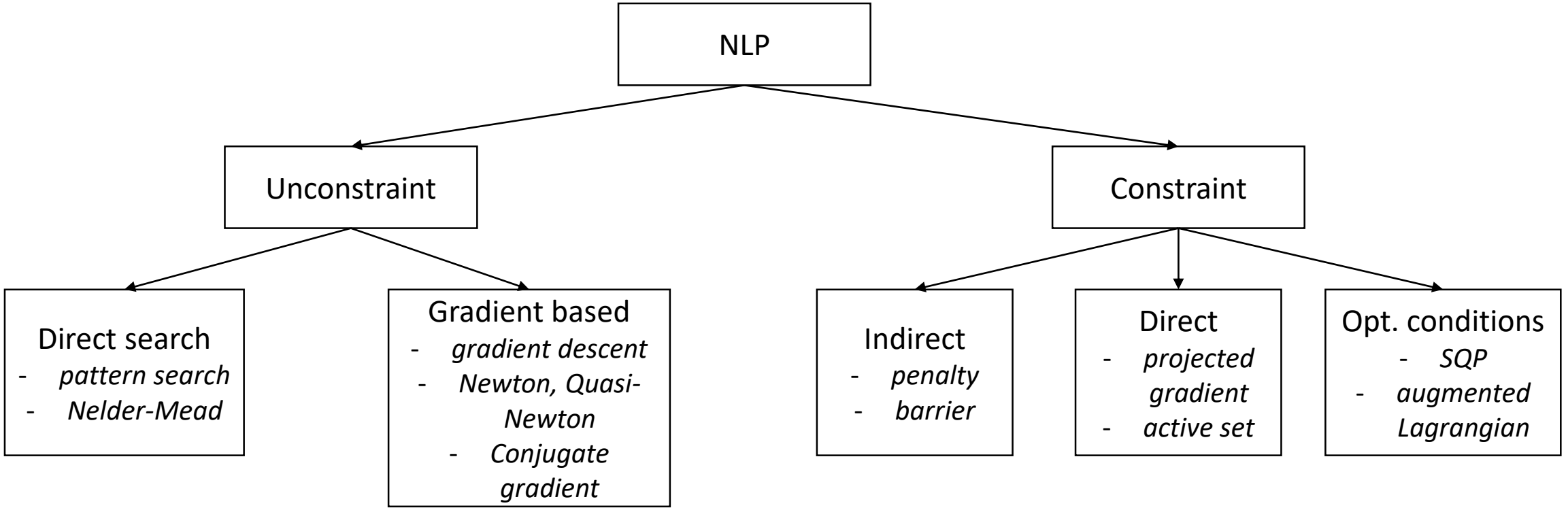
TIEA382 Linear and discrete optimization

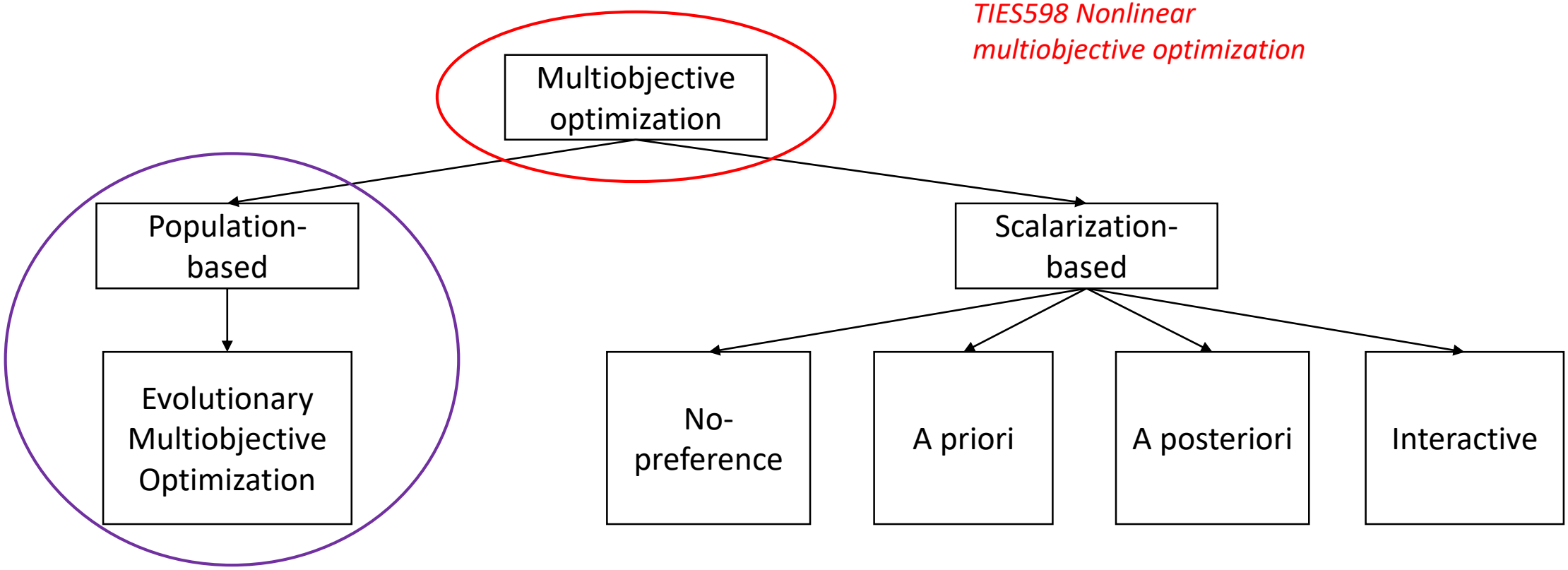
TIES483 Nonlinear optimization

TIES451 Selected topics in soft computing



From: Dutta, S., 2016. *Optimization in Chemical Engineering*. Cambridge University Press.


NLP
Unconstraint
Constraint
Direct search
- pattern search
- Nelder-Mead
Gradient based
- gradient descent
- Newton, Quasi-Newton
- Conjugate gradient
Indirect
- penalty
- barrier
Direct
- projected gradient
- active set
Opt. conditions
- SQP
- augmented Lagrangian



TIES598 Nonlinear multiobjective optimization

TIES451 Selected topics in soft computing

Decision maker's involvement

Tools used in the course

- Python
- Jupyter Notebooks
  - Different Kernels, e.g. Python and R
- Scipy.optimize
  - Optimization package including different types of optimizers
- Pyomo
  - Algebraic modelling language for defining optimization problems
  - External optimizers can be used (glpk, Cplex, Gurobi, Ipopt, Baron,…)
- WWW-NIMBUS and DESDEO for interactive multiobjective optimization

And…

- TIES598 Nonlinear multiobjective optimization
  - Starts after this course!
- TIES583 Advanced course on optimization
  - Topic changes, last spring it was data-driven optimization
  - Lectured next time in spring 2022
- 1-2 courses every summer in the JYU Summer School
  - https://www.jyu.fi/en/research/summer-and-winter-schools/jss
  - Lecturers typically outside of JYU
  - Topics based on relevance
  - This year
    - COM1: Stochastic Optimization - Models, Algorithms and Applications
    - COM3: Multicriteria Design Optimization in the Age of Data Science - Fundamentals and Case Studies