Program for the Optimization course

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1. Introduction to optimization

- Nonlinear Programming

   2. Prerequisites for nonlinear optimization (gradient, Hessian, descent directions, rate of convergence)
   3. Gradient method (quadratic and nonlinear functions)
   4. Newton method and introduction to linesearch
   5. Least-squares and Gauss Newton
   6. Constrained optimization and KKT conditions, projected gradient
   7. Toward machine learning: subsampled methods and stochastic methods

- Linear Programming

   8. Geometry of Linear Programming, Polytopes
   9. Polyhedra
   10. Simplex algorithm
   11. Duality
   12. Integer Linear Programming (ILP): TU, integer polytopes, examples on graphs, maximum flow
   13. ILP: Integrality gap and Erdos-Posa property
   14. LP rounding