

# NUMERICAL METHODS FOR OPTIMIZATION PROBLEMS

CSC 2305

Course Description

Winter 2007

Possible topics include: optimization along a line; steepest descent methods; Newton's method; quasi-Newton methods; conjugate gradient methods; variants of Newton's method for nonlinear least squares problems; projection methods for optimization subject to linear constraints; Lagrangian methods for optimization subject to nonlinear equality constraints; penalty function methods for optimization subject to nonlinear inequality constraints.

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(If you email me, put CSC 2305 in your subject line so that your message won't be caught by my spam filter.)

**Course Webpage:** <http://www.cs.toronto.edu/~krj/courses/2305/>

**Office Hours:** by appointment

**Lectures:** Mondays 10 AM to noon in WB 119.

(The Wallberg Building (WB) is connected to the Pratt Building; it is immediately to the south of Pratt. It is WB on our campus map <http://oracle.osm.utoronto.ca/map/>)

**Course Text:** *Numerical Optimization*, **Second Edition**, Jorge Nocedal and Stephen J. Wright, Springer, 2006. You can purchase it at the UofT Bookstore or at one of the online bookstores (such as Amazon or Chapters-Indigo). Make sure you get the second edition.

**Prerequisites:** An undergraduate numerical analysis course such as CSC 350. Good knowledge of numerical linear algebra and vector calculus (e.g., eigenvectors, LU factorization and partial derivatives) and good programming skills. Previous experience with MatLab will be helpful, but not essential.

**Grading:** The grade for the course will be based on

1. Term Assignments: 30%  
(There will likely be an assignment every week or two.)
2. Midterm Test: 30%
3. Final Exam or project: 40%.  
(You can choose to do a final exam or a project of your own choosing. If you would like to do a project, talk to me about it before you start to ensure that it is suitable.)

**MatLab:** See our course webpage for some MatLab primers.

**Plagiarism:** Please read [www.cs.toronto.edu/~fpitt/plagiarism.html](http://www.cs.toronto.edu/~fpitt/plagiarism.html) and [www.cs.toronto.edu/~clarke/acoffences/](http://www.cs.toronto.edu/~clarke/acoffences/)