MATH 652: Optimization II

Lecturer:	Prof. Wolfgang Bangerth Blocker Bldg., Room 507D (979) 845 6393 bangerth@math.tamu.edu
Office hours:	Tuesdays, 2:30–5:00pm
Lecture:	Tuesdays + Thursdays, 12:45–2:00pm Civil Engineering 134

Course Outline
Since MATH 651 (Optimization I) and MATH 652 (Optimization II) form a sequence, let me present a list of topics for both courses at the same time:

MATH 651	MATH 652
Examples of optimization problems and their solutions Optimality conditions for unconstrained nonlinear problems Algorithms for unconstrained nonlinear problems Optimality conditions for constrained nonlinear problems Algorithms for constrained problems Global optimization	Linear programming Duality theory Infinite dimensional optimization Large-scale problems and PDE optimization Optimal control Optimization with complex objective functions: optimization under uncertainty, optimal design, optimization for stability Integer programming

Additional topics may be added at the descretion of the instructor. Topics may also be moved from MATH 651 to MATH 652 or the other way around as time permits.

Textbook
I draw most of my material from the following books. However, you are not required to have them for this class – I strive to be self-contained, and I will in particular not give homework that references these books:

J. Nocedal and S. J. Wright: Numerical Optimization, 2nd edition, 2006, Springer.

S. Nash and A. Sofer: Linear and nonlinear programming, 1996, McGraw-Hill.

D. G. Luenberger: Optimization by Vector Space Methods, 1997, Wiley Interscience.

D. Bertsimas and J. N. Tsitsiklis: Introduction to linear optimization, 1997, Athena Scientific.

J. T. Betts: Practical methods for optimal control using nonlinear programming, 2001, SIAM.

F. Tröltzsch: Optimale Steuerung partieller Differentialgleichungen (in German), 2005, Vieweg.

Prerequisites
Basics of programming, analysis. MATH 417 or MATH 609 are very helpful. I will make references to Math 651 ("Optimization I") so if you didn't take that I advise you read through the book by Nocedal and Wright before the time when we get to the section on infinite dimensional optimization.

Webpage
Homework assignments and other course information will be posted on

`http://www.math.tamu.edu/~bangerth/teaching.html`

Exams + Grading
Final course grades will be computed from homework and programming assignments (60%) and exams (40%).

There will be one comprehensive final exam 5/12/2010 from 8–10am. I will allow students to replace the final exam by a project to be determined during the course of the semester; the project will involve writing a report and/or giving a presentation to the class about the findings.

Make-up exams: Students must make arrangements in advance if they will not be handing in homework on time or will miss an exam. Absences due to recognized University-related activities, religious holidays, verifiable illness, and family/medical emergencies will be dealt with on an individual basis, but require a written excuse. Please let Dr. Bangerth know about this as soon as possible, and preferably in advance.

Incompletes: I will consider giving an incomplete if you have successfully completed all but a small portion of the work of the course, and are prevented from completing the course by a severe, unexpected event. Simply being behind work is not a reason for an Incomplete, though; in that case you should consider dropping the course.

S/U grades: If you are registered S/U your grade will be 'S' if your letter grade is C or above, and 'U' otherwise.

Policies
Academic integrity: The usual rules of academic intregrity apply. In particular, the Aggie Honor Code "An Aggie does not lie, cheat or steal, or tolerate those who do" should be selfevident, see

`http://www.tamu.edu/aggiehonor.html`

Students may, and are encouraged to, work together and discuss homework problems with each other. However, copying work done by others is an act of scholastic dishonesty and will be persecuted to the full extent allowed by University policy.

Disabilities: If you have a disability and need special assistance, please contact me so we can make accomodations. The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accomodation of their disabilities. If you believe you have a disability requiring an accomodation, please also contact Services for Students with Disabilities, Koldus 126, 845-1637.

For other policies and other information, please read

`http://www.math.tamu.edu/teaching/operationspg.html`