

UB - Department of Industrial and Systems Engineering  
IE 671 Nonlinear Programming  
Fall 2011

Last Modified: August 16, 2011

## 1 COURSE CONTACT

- Class Meetings: Tue Thur, 12:30 PM - 1:50 PM at [Center for the Arts \(CFA\)](#) 144
- Course Website: <http://ublearns.buffalo.edu>
- Instructor: Dr. Changyun Kwon
  - E-mail: [chkwon@buffalo.edu](mailto:chkwon@buffalo.edu)
  - Office: 400 Bell Hall
  - Office hours: Tue 2:00 PM - 3:00 PM, Wed 11:00 AM - 12:00 PM

When you email the instructor, you need to include your name and the course number (IE 671). Please state “IE 671” in the subject of your email message. Also, it is very helpful to set up your email client correctly so that your name actually appears as the sender in your email message.

## 2 PREREQUISITES

- IE 572 Linear Programming or equivalent
- Scientific computer programming skills (MATLAB, C/C++/C#, Java, Python, Perl, ... ): Homework assignments will include many computer implementations of optimization algorithms.

## 3 REQUIRED TEXTBOOK

- Bazaraa, Sherali and Shetty, *Nonlinear Programming: Theory and Algorithms*, Wiley-Interscience, 3rd Edition, 2006.

## 4 ADDITIONAL REFERENCES

- Books
  - Bertsekas, *Nonlinear Programming*, Athena Scientific, 1999
  - Mangasarian, *Nonlinear Programming*, SIAM, 1987
  - Peressini, Sullivan and Uhl, Jr., *The Mathematics of Nonlinear Programming*, Springer, 1993
  - Nocedal and Wright, *Numerical Optimization*, Springer, 2006
  - Ruszczynski, *Nonlinear Optimization*, Princeton University Press, 2006
  - Luenberger and Ye, *Linear and Nonlinear Programming*, Springer, 2010
  - Boyd and Vandenberghe, *Convex Optimization*, Cambridge University Press, 2004
  - Bertsekas, Nedic and Ozdaglar, *Convex Analysis and Optimization*, Athena Scientific, 2003

- Borwein and Lewis, *Convex Analysis and Nonlinear Optimization: Theory and Examples*, Springer, 2000.
- Relevant Scientific Journals
  - Mathematical Programming
  - Journal of Optimization Theory and Applications
  - Mathematics of Operations Research
  - Operations Research Letter
  - SIAM Journal on Optimization
  - SIAM Journal on Control and Optimization
  - and many other Operations Research / Optimization journals.
  - A list is available at: <http://www.chkwon.net/Main/Journals>

## 5 TOPICS COVERED

- Basic Concepts and Modeling
- Convex Analysis
- Optimality Conditions
- Lagrangian Duality
- Optimization Algorithms
- Variational Inequalities and Complementarity Problems
- Applications in Computational Game Theory
- Robust Optimization

## 6 GRADING

- **25% Homework Assignments.** You must work on the homework problems independently. You are allowed to discuss with other fellow students, but you must present the idea independently, and state the names of the students with whom you discussed. The allowed discussion does NOT include reading other students' writings.
- **25% Mid-term Exam I.** One front-and-back reference sheet will be allowed. Tentatively scheduled on September 27th.
- **25% Mid-term Exam II.** One front-and-back reference sheet will be allowed. Tentatively scheduled on November 22nd.
- **25% Final Exam.** One front-and-back reference sheet will be allowed. Tentatively scheduled on December 8th.

## 7 ACADEMIC HONESTY AND INTEGRITY

The University at Buffalo has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for appropriate citation of sources, and for respect for others academic endeavors. By placing their name on academic work, students certify the originality of all work not otherwise identified by appropriate acknowledgments. Please take your time to visit <http://www.grad.buffalo.edu/policies/academicintegrity.php>

One simple rule: If you fail to meet the UB policy and the instructor's policy for academic honesty and integrity, you will at least receive 'F', and it is possible that you are suspended or expelled from the university.

## 8 EXAMPLES OF ACADEMIC DISHONESTY

Academic dishonesty includes, but is not limited to, the following:

- *Previously submitted work.* Submitting academically required material that has been previously submitted in whole or in substantial part in another course, without prior and expressed consent of the instructor.
- *Plagiarism.* Copying or receiving material from any source and submitting that material as one's own, without acknowledging and citing the particular debts to the source (quotations, paraphrases, basic ideas), or in any other manner representing the work of another as one's own.
- *Cheating.* Soliciting and/or receiving information from, or providing information to, another student or any other unauthorized source (including electronic sources such as cellular phones and PDAs), with the intent to deceive while completing an examination or individual assignment.
- *Falsification of academic materials.* Fabricating laboratory materials, notes, reports, or any forms of computer data; forging an instructor's name or initials; resubmitting an examination or assignment for reevaluation which has been altered without the instructor's authorization; or submitting a report, paper, materials, computer data, or examination (or any considerable part thereof) prepared by any person other than the student responsible for the assignment.
- *Misrepresentation of documents.* Forgery, alteration, or misuse of any University or Official document, record, or instrument of identification.
- *Confidential academic materials.* Procurement, distribution or acceptance of examinations or laboratory results without prior and expressed consent of the instructor.
- *Selling academic assignments.* No person shall sell or offer for sale to any person enrolled at the University at Buffalo any academic assignment, or any inappropriate assistance in the preparation, research, or writing of any assignment, which the seller knows, or has reason to believe, is intended for submission in fulfillment of any course or academic program requirement.
- *Purchasing academic assignments.* No person shall purchase an academic assignment intended for submission in fulfillment of any course or academic program requirement.

## 9 DISABILITY SERVICES

If you have a disability and may require some type of instructional and/or examination accommodation, please inform me early in the semester so that we can coordinate the accommodations you may need. If you have not already done so, please contact the Disability Services office. The office is located at 25 Capen Hall and the telephone number is (716) 645-2608. The website is at: <http://www.ub-disability.buffalo.edu/>