

The University of Kansas
Electrical Engineering and Computer Science

EECS 868 Mathematical Optimization with Applications
Spring Semester 2019

1. General Information

Place, Times, Credits: 3150 Learned, 9:30-10:50 TR, 3 credit hours
Text: *Linear and Nonlinear Programming, Third Edition*
David G. Luenberger and Yinyu Ye, Springer, 2008
Reference: *Numerical Optimization, Second Edition*
Jorge Nocedal and Stephen J. Wright, Springer, 2006
Prerequisites: MATH 590 or EECS 639, or the consent of the instructor
Professor: David W. Petr
Office Hours: 2001C Eaton: TR 11:00-12:00 or by appointment
Telephone: 2001C Eaton: 864-8823
Email: dwp@ku.edu
Course website: http://www.ittc.ku.edu/EECS/EECS_967

2. Course Description (Catalog)

A mathematical study of the minimization of functions. The course provides an introduction to the mathematical theory, implementation, and application of a variety of optimization techniques, with an emphasis on real-world applications. Optimization problem formulation. Unconstrained and constrained minimization, including conditions for optimality. Specific techniques for solving linear and nonlinear programming problems. Convergence of algorithms.

3. Course Schedule (subject to change)

Topic	Meetings (75 min)
Overview of optimization	1.5
Unconstrained optimization theory	5
Descent direction methods	5
Conjugate gradient methods	2.5
Linear programming basics	3
Midterm Exam	1
Simplex method for LP	3
Other LP topics	2
LP duality	2
Constrained nonlinear programming	5
Dynamic Programming?	

4. Policies

4.1 Grade Composition and Letter Grades

Homework	25%
Projects	25%
Midterm Exam	25%
Final Exam	25%
Total	100%

The mapping from your final course score to your grade for the course will be based *to a first approximation* on the thresholds of 93% for an A, 90% for an A-, 87% for a B+, 83% for a B, 80% for a B-, etc.

However, I reserve the right to adjust the letter grade thresholds based on the final distribution of course scores. As an example of what I mean by this, if there are several students with scores from 94% to 99%, several more with scores from 87% to 90%, and none in between, the entire second group of students would likely get the same grade, which would likely be a B+. The thresholds could also be moved down, e.g., under other circumstances I may assign an A- to a student with a score of 89%. I will expect the quality of work (and hence the grades) to be consistent with the fact that this is a graduate-level course.

4.2 Exams

The mid-term exam is closed book. I will provide any reference information (tables, etc.) I think you may need. You will also be allowed one 8 1/2 by 11 sheet of notes (one side) for the mid-term exam. I am planning to give a final exam (cumulative) at the scheduled final exam time, but I reserve the right to substitute for that either a take-home final exam (cumulative), or a final project. If such a substitution is made, the substitute will have the same weight as the final exam would have had.

4.3 Make-Ups

Make-up exams given only if: 1) I am informed in **ADVANCE** of the exam (in person or by phone conversation, email, voice mail, message left with secretary, or some other means), and 2) I deem the reason to be sufficiently meritorious (job interviews are not). If the reason is illness, I **REQUIRE** documentation of the illness from a health-care professional. The documentation can be provided after the exam.

4.4 Homework

I anticipate that homework assignments will be given approximately bi-weekly. Some homework will involve using the MATLAB software. Late homework is **NOT** accepted (no exceptions). Problems must be stapled together and include student name, KUID, course number and date due. Generally I may grade only a subset of the problems, but you are responsible for all problems assigned. Problem solutions (for all problems) will be made available on the course website.

4.5 Projects

I expect to assign three projects during the semester in addition to regular homework. At least one of these is likely to involve using MATLAB software.

4.6 Reading

You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture. Most assignments will be from the text, but some course topics are not covered in the text, requiring supplementary reading.

4.7 Academic Misconduct

Although I encourage students to *study* together, *cheating* will be dealt with severely, with penalties up to and including a grade of F in the class and referral to the Dean. Cheating is essentially representing someone else's work as your own. Cheating includes, but is not limited to, copying solutions/answers from another student or from a solution manual, having another student do your work for you, using a simulation model that another student has developed/debugged, etc. If you are ever in doubt about what level of collaboration is acceptable, contact me.

4.8 Course Website

The web site for the course will contain supplemental information and resources for this course. It will be updated from time to time as the course progresses.

5. Dates of Interest

28 January	Monday	Last day to add a class on-line
28 January	Monday	Last day to drop with 100% refund
29 January	Tuesday	First day for 50% refund
11 February	Monday	Last day to drop with no transcript record
18 February	Monday	Last day for 50% refund (no refund after this date)
11 March	Monday	First day of Spring Break
17 March	Sunday	Last day of Spring Break
22 April	Monday	Last day to withdraw (W on transcript)
9 May	Thursday	Last day of classes
10 May	Friday	Stop Day
15 May	Wednesday	Scheduled Final Exam Period: 7:30 - 10:00 am (yes, AM)

NOTICES

Student Access Services: The Academic Achievement & Access Center (AAAC) coordinates accommodations and services for all KU students who are eligible. If you wish to request accommodations and have not contacted AAAC, please do so as soon as possible. Their office is located in 22 Strong Hall; their phone number is 785-864-4064 (V/TTY). Information about their services can be found at <http://achievement.ku.edu/>. Please contact me privately in regard to your needs in this course.

Concealed Carry: Individuals who choose to carry concealed handguns are solely responsible to do so in a safe and secure manner in strict conformity with state and federal laws and KU weapons policy. Safety measures outlined in the KU weapons policy specify that a concealed handgun:

- Must be under the constant control of the carrier.

- Must be out of view, concealed either on the body of the carrier, or backpack, purse, or bag that remains under the carrier's custody and control.
- Must be in a holster that covers the trigger area and secures any external hammer in an un-cocked position.
- Must have the safety on, and have no round in the chamber.

Tests and Quizzes: Instructors are allowed by Kansas Board of Regents policy to require backpacks, purses and other bags be placed together in a designated place in the classroom during exams and quizzes, and as such those items will not be under the constant control of the individual. Students who choose to carry a concealed handgun in a purse, backpack, or bag must review and plan each day accordingly, and are responsible for making alternate arrangements as necessary. The university does not provide appropriate secured storage for concealed handguns.

Individuals who violate the KU weapons policy may be asked to leave campus with the weapon and may face disciplinary action under the appropriate university code of conduct.

Course Materials: Course materials prepared by the instructor, together with the content of all lectures and review sessions presented by the instructor are the property of the instructor. Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. On request, the instructor will usually grant permission for students to make audio recordings of lectures, on the condition that these audio recordings are only used as a study aid by the individual making the recording. Unless explicit permission is obtained from the instructor, recordings of lectures and review sessions may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course.