

AAE 561000: Introduction to Convex Optimization

1. Instructor Information

- Dengfeng Sun, Associate Professor of AAE
- Office: ARMS 3217
- Phone: x4-5718
- Email: dsun@purdue.edu
- Office hours: ~~Thursday 2:45-3:30 PM~~ in ARMS 3217

2. Course Information

- Description
This course aims to introduce students basics of convex analysis and convex optimization problems, basic algorithms of convex optimization and their complexities, and applications of convex optimization in aerospace engineering. This course also trains students to recognize convex optimization problems that arise in scientific and engineering applications, and introduces software tools to solve convex optimization problems.
- Prerequisites
Graduate standing or permission of the instructor.
- Textbook
Convex Optimization, by Stephen Boyd and Lieven Vandenberghe, Cambridge University Press, free downloadable from Prof. Stephen Boyd's webpage at Stanford University.

3. Course Objectives

On completing this course, the student shall be able to: 1) Understand basics of convex analysis and convex optimization problems. 2) Understand and develop basic algorithms of convex optimization and their complexities. 3) Apply convex optimization to solve engineering problems.

4. Course Policies

- Attendance
The instructor will not take attendance, however, you are highly encouraged to attend every class. Projects and homeworks may require knowledge of ANY material presented in class. If you must miss a class, you are responsible for all covered lecture material, assignments and announcements made.
- Grading criteria: Homework 60%, course project 40%.

5. Class Schedule (tentative)

- 1) General optimization (2 weeks)
- 2) Convex sets and convex functions (2 weeks)
- 3) Smooth convex optimization (3 weeks)
- 4) Nonsmooth convex optimization (2 weeks)
- 5) Convex optimization examples (2 weeks)
- 6) Self-concordant functions and self-concordant barriers (2 weeks)
- 7) Application of convex optimization (2 weeks)

6. Other Information

- If you have a disability which requires some special accommodation, please let me know within the first two weeks of the semester to discuss the appropriateness of the instructor's methods in this class or any other accommodation you may need.
- In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. If such unusual circumstances arise, we will notify you via email. A special note about highly-contagious disease – We do not want ill students in class spreading the virus. If you are diagnosed with any highly contagious disease, contact Professor Sun via email (dsun@purdue.edu) to make arrangements.

7. Emergency Preparedness

- To report an emergency, call 911. To obtain updates regarding an ongoing emergency, sign up for Purdue Alert text messages, view www.purdue.edu/ea
- There are nearly 300 Emergency Telephones outdoors across campus and in parking garages that connect directly to the PUPD. If you feel threatened or need help, push the button and you will be connected immediately.
- If we hear a fire alarm during class we will immediately suspend class, evacuate the building, and proceed outdoors. Do not use the elevator.
- If we are notified during class of a Shelter in Place requirement for a tornado warning, we will suspend class and shelter in the basement.
- If we are notified during class of a Shelter in Place requirement for a hazardous materials release, or a civil disturbance, including a shooting or other use of weapons, we will suspend class and shelter in the classroom, shutting the door and turning off the lights.
- ARMS 3115 evacuation and shelter-in-place procedures: <https://engineering.purdue.edu/Intranet/Groups/Administration/RPM/Safety/ClassroomEmergencyPlanning/ARMS/ARMS%203115.pdf>
- Please review the Emergency Preparedness website for additional information. http://www.purdue.edu/ehps/emergency_preparedness/index.html