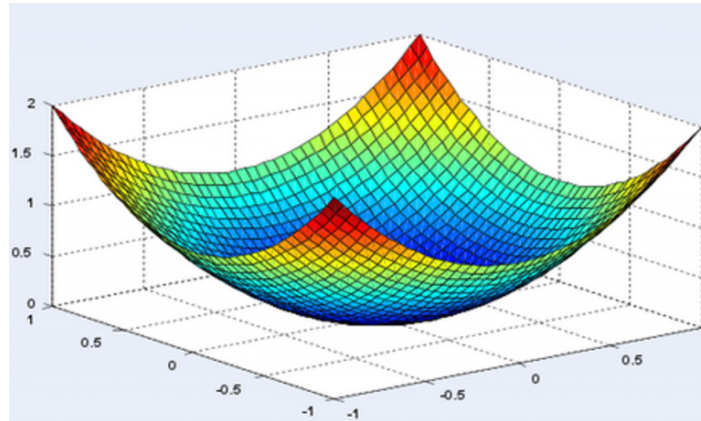


## CMPE/ENEE 491/691 Special Topics

### Convex Optimization

Spring 2020

**Instructor:** Seung-Jun Kim (Asst. Prof., CSEE; E-mail: [sjkim@umbc.edu](mailto:sjkim@umbc.edu))



This is an introductory course on convex optimization, which is a subclass of numerical optimization that often admits efficient and reliable solutions. Through this course, the students will be able to recognize and formulate convex optimization problems for applications in various domains, and solve them using appropriate packages or derive suitable algorithms tailored to the problems. Students from diverse disciplines will benefit, including engineering (electrical, computer, mechanical) and computer science (machine learning, AI, networks, data science), as well as mathematics, statistics, and economics. The students will get hands-on experience by working on computer projects.

**Prerequisite:** Calculus and linear algebra. Working knowledge on scientific programming languages such as Matlab or Python. Exposure to numerical optimization and applications is helpful but not required.

#### Catalog description

Provides basic theory and practice for formulating and solving convex optimization problems arising in various disciplines. Convex sets. Convex functions. Convex optimization problems. Basic convex analysis. Least-squares. Linear and quadratic programs. Semidefinite program. Optimality conditions. Duality. Interior-point methods. Subgradient. Decentralized convex optimization. Convex relaxation. Robust optimization. Applications to signal processing, statistics, machine learning, engineering, and finance.

#### Textbook

S. Boyd and L. Vandenberghe, *Convex Optimization*, Cambridge University Press.  
(An online version is available for free at <https://web.stanford.edu/~boyd/cvxbook/>)

**Time & Place:** MoWe 4-5:15PM, ITE Building 104