

# AU4606/AI4702: NETWORK OPTIMIZATION

Fall 2023

## Instructor Information

1. Instructor: Xiaoming Duan, <https://xmduan.github.io/index.html>
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## Lectures:

1. AU4606:  
Mondays and Thursdays, 10:00am-11:40am, Week 1-8;  
Mondays, 10:00am-11:40am, Week 9-16
2. AI4702: Mondays and Thursdays, 10:00am-11:40am, Week 1-8

## Prerequisites:

No formal prerequisites. Some familiarity with linear algebra, optimization, graph theory, linear programming, and data structure would be helpful. However, the course should self-contained and does not assume particular prior knowledge. Having said that, the course will involve quite a bit mathematical proofs and algorithm analysis.

## Main References:

Books:

- Ravindra K. Ahuja, Thomas L. Magnanti, James B. Orlin, *Network Flows: Theory, Algorithms, and Applications*, Prentice-Hall, 1993.
- David P. Williamson, *Network Flow Algorithms*, Cambridge University Press, 2019.
- Mokhtar S. Bazaraa , John J. Jarvis, Hanif D. Sherali, *Linear Programming and Network Flows*, Wiley, 2009.

Relevant courses

- MIT 15.082J/6.855J/ESD.78J: <https://ocw.mit.edu/courses/15-082j-network-optimization-fall-2010/>
- Cornell ORIE 6330: <https://people.orie.cornell.edu/dpw/orie6330/>
- (Recommended) MIT 6.042: <https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/>

## Objectives:

- Understanding basic concepts in graph theory
- Understanding algorithms for shortest path problems, maximum flow problems and minimum cost flow problems
- Familiarizing algorithm analysis techniques

## Requirements and grading:

There will be 4 problem sets and 6 problem sets for AI4702 and AU4606 students, respectively. These problem sets will contain exercises that call for proofs and coding assignments. The grading will be based on attendance (20%) and the homework (80%).