Operations Research Syllabus

Mohammed Brahimi

Instructors information

- Dr. Mohammed Brahimi
- Assistant Professor of Computer Science
- **Office hours:**
  - **Monday 1:00 PM to 2:30 PM**

- **Link to profile:**
  - https://ensia.edu.dz/biography/mohammed.brahimi/
- **Research interest:**
  - Machine learning and deep learning applied to real problems

- Dr. Soumaya Lakehal
- Assistant Professor of Mathematics
- **Office hours:**
  - **TBD**

- **Link to profile:**
  - https://ensia.edu.dz/biography/soumaya.lakehal/
- **Research interest:**
  - Algorithms, Parallel Computing, Manufacturing Engineering, Heuristics, Logistics

Course description

*“ Operations Research (OR) module **connects theory and practice**, providing students with the **tools to model real-world problems** using linear programming and graph theory, and to **effectively solve these models and interpret their results**”*

Learning objectives

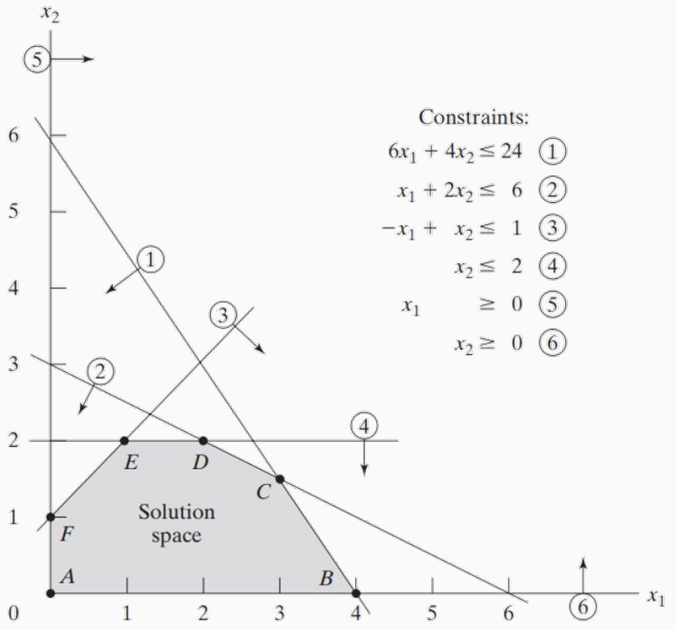
- Understand OR methodology for real-world problem-solving
- Understand Linear Programming (LP) and be able to use of solvers
- Familiarize the student with graph theory concepts
- Learn how to model a problem and solve it using LP and graph theory

Prerequisite

- Familiarity with basic mathematical concepts and techniques, such as algebra and calculus
- Knowledge of linear algebra, especially with regards to solving systems of linear equations

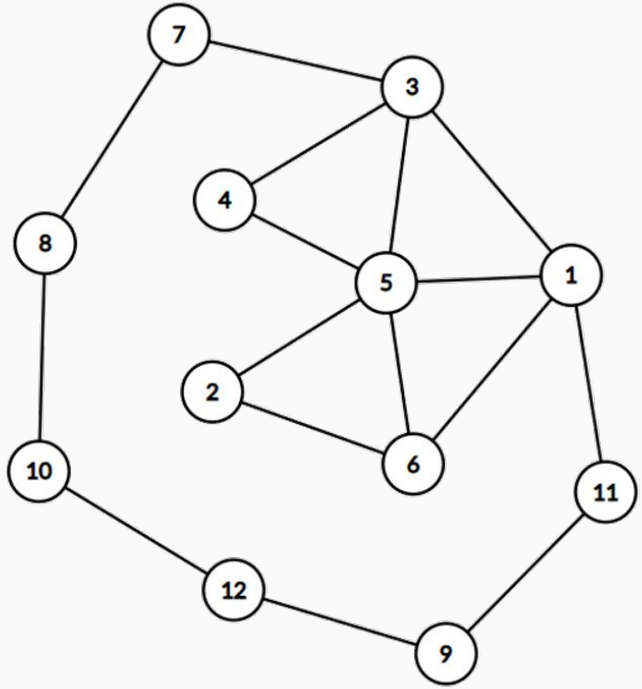
Course content (Part 1:Linear Programing)

1. The art of solving real-world problems: Operations Research (OR)
2. Linear Programming (LP) and graphical solution
3. Simplex algorithm for solving Linear Programming (LP)
4. Post Optimality analysis
5. Solving linear programming using solvers
6. Revision about linear programing



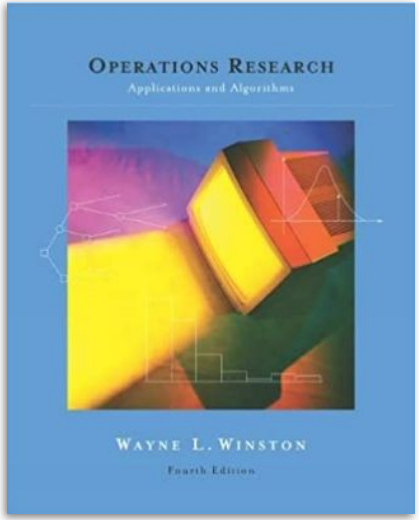
Course content (Part 2: Graph theory)

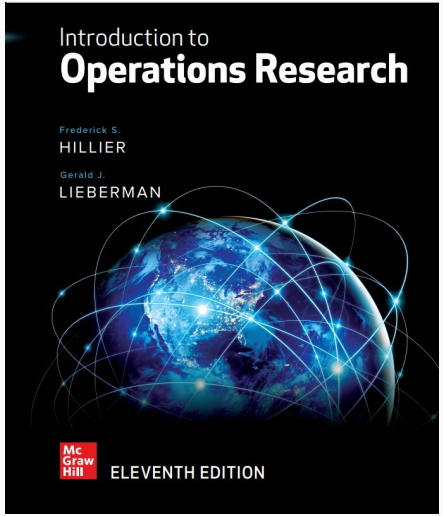
7	Introduction to graph theory and basic concepts
8	Paths and Connectivity in graphs
9	Trees
10	Planar graphs
11	Partitioning and coloring problems
12	Shortest Path and Maximum Flow problems
13	Applications of Graph Theory to problems
14	Revision about Graph theory

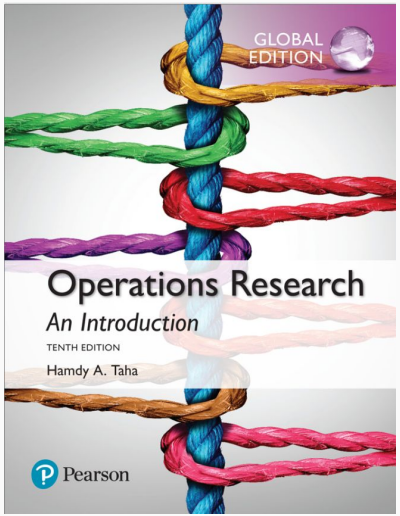


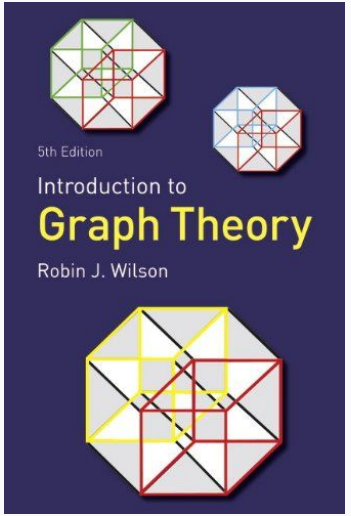
Suggested text Books

The proposed textbooks are optional and only serve as a supplement to enhance your understanding of the course material.









Assessment method & Grading policy

- Exam - 50%
- Continuous Evaluation - 50%
  - Mid-Term Exam - 10 points (**Thursday, May 11th**)
  - Quizzes/Homeworks - 5 points
  - Instructor Appreciation - 3 points
  - Attendance - 2 points (maximum 2 absence)
  - OR practical project - Extra 3 points (For maximum 10 students)

Assessment method & Grading policy

- Late Quizzes/Assignments/Homework
  - **- 20%** penalty per day, up to 2 days
  - After 2 days, no points will be awarded

- Demonstration may be organized for the OR project

Attendance & Participation Policy

- Regular attendance is expected
- Participation in class discussions and group activities mandatory
- More than 2 absences without justification may result in disciplinary actions
- Unexcused lateness to class will not be accepted.

Academic Honesty Policy

- All work must be original and completed to the best of ability
- **Plagiarism** and **cheating** will not be tolerated
- Appropriate disciplinary action will be taken for violations

Education is not the filling of a pail, but the lighting of a fire.

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