Course Code Course Name Semester Theory Practice Lab Credit ECTS

IND403 Network Models 7 3 0 0 3 4

Prerequisites IND371
Admission Requirements IND371
Language of Instruction French
Course Type Elective

Course Level Bachelor Degree

The aim of this course is i) To ensure that the students learn the basic terminology related to graph theory, ii) To enable the student to evaluate how to model network flow problems that they may encounter in practice, iii) To enable the students to choose the appropriate method to solve a network flow model, and iv) To provide the students the ability to solve some special network flow problems encountered in practice. These problems,

Objective encountered in many areas such as production, logistics, supply chain, transportation, telecommunications, etc., can

be modeled either directly or indirectly with network flow models, which are an important sub-branch of Operations Research. For this reason, the knowledge and skills to be acquired in this course will help graduate students both to solve the complex problems they will encounter in practice and to adapt to Industrial Engineering programs at the

master's-doctoral level.

1. Week: Course introduction

2. Week: Network models terminology

3. Week: Use of software for basic network models

4. Week: Minimum cost-flow problem5. Week: Maximum flow problem6. Week: Shortest path problem7. Week: Assignment problem

Content 8. Week: Midterm

9. Week: Minimum spanning tree problem

10. Week: Use of software for mixed-integer programming models

11. Week: Network simplex algorithm12. Week: Traveling salesman problem13. Week: Vehicle routing problem14. Week: Project presentations

1. Ahuja, R.K., Magnanti, T.L., Orlin, J.L., "Network Flows: Theory, Algorithms, and Applications", Prentice Hall,

1993.

2. Hillier, F.S., Lieberman, G.J., "Introduction to Operations Research", McGraw-Hill, 2010.

3. Rosen, K.H., "Discrete Mathematics and Its Applications", McGraw-Hill, 2007.

4. https://github.com/UfukBahceci/GraphUtilitiesPython

5. https://github.com/UfukBahceci/NetworkModelsLectureNotes

Theory Topics

References

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