



## *The Hebrew University of Jerusalem*

### *Syllabus*

## *Linear Models - 55841*

*Last update 24-10-2019*

*HU Credits:* 3

*Degree/Cycle:* 2nd degree (Master)

*Responsible Department:* Business Administration

*Academic year:* 0

*Semester:* 2nd Semester

*Teaching Languages:* Hebrew

*Campus:* Mt. Scopus

*Course/Module Coordinator:* Nicole Adler

*Coordinator Email:* [msnic@huji.ac.il](mailto:msnic@huji.ac.il)

*Coordinator Office Hours:* Monday 14:00-15:00

*Teaching Staff:*

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Prof Nicole Adler

Course/Module description:

*This course develops the basic principals of linear programming in the first half of the semester. We will discuss the theory and applications, including formulations, simplex, solution spaces, sensitivity analyses and policy alternatives. In the second half, we discuss integer linear programming, goal programming, network theory, game theory and finally productivity measurement.*

Course/Module aims:

*The course aims to provide students with a theoretical understanding of mathematical programming and its potential applicability. Students will be able to formulate, solve and analyze real world business questions using the techniques taught in this course.*

Learning outcomes - On successful completion of this module, students should be able to:

- *Formulate word problems as mathematical programs*
- *Solve linear programs using the simplex method*
- *Interpret sensitivity analysis*
- *Adapt the theory to practical, real world business applications*
- *Formulate and solve integer linear programs*
- *Formulate and solve multi objective programming*
- *Formulate and solve network optimization problems*
- *Formulate game theoretic concepts using linear programming concepts*
- *Formulate and solve data envelopment analysis models*

Attendance requirements(%):

*Teaching arrangement and method of instruction: Classes, discussions, active learning and exercises*

Course/Module Content:

*Formulating linear programs, linear algebra, the simplex method, duality theory and sensitivity analysis, integer linear programming, multi-objective programming, network optimization, game theoretic concepts and data envelopment analysis.*

Required Reading:

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Bradley, S. P., Hax, A. C., & Magnanti, T. L. (1977). *Applied mathematical programming*. Reading, Mass.: Addison-Wesley Pub. Co. Call number: QA 402.5 B7. (<http://web.mit.edu/15.053/www/>).

Additional Reading Material:

(II) Taha, H. A. (2003). *Operations research: An introduction (7th ed.)*. Upper Saddle River, N.J.: Prentice Hall. Call number: T 57.6 T3. (for the more mathematically inclined, short and sweet)

(III) Winston, W. L. (2004). *Operations research: Applications and algorithms (4th ed.)*. Belmont, CA: Thomson/Brooks/Cole. Call number: 003 W783. (for those who like the American style i.e. the more words the better and the more exercises the better too, life is a trade-off)

(IV) Nemhauser, G. L., & Wolsey, L. A. (1988). *Integer and combinatorial optimization*. New York: J. Wiley & Sons. Call number: QA 402.5 N453.

(V) Ravindra K. Ahuja, Thomas L. Magnanti, James B. Orlin (1993). *Network Flows: Theory, Algorithms, and Applications*. Prentice Hall; 1 edition. Call number: T 57.85 A37.

(VI) Coelli T, Prasada Rao DS, Battese G. (2005). *An Introduction to Efficiency and Productivity Analysis*, Kluwer Academic Publishers, New York. Call number: HB 241 C64 2005.

Course/Module evaluation:

End of year written/oral examination 0 %

Presentation 0 %

Participation in Tutorials 10 %

Project work 70 %

Assignments 0 %

Reports 0 %

Research project 0 %

Quizzes 20 %

Other 0 %

Additional information: