

SYLLABUS LINEAR PROGRAMMING (MT1521BME, ECTS 5)

The mission of ZSEM is to transfer values, knowledge, and skills that students need for long-term success in a globalized business world undergoing constant technological and market transformations

LECTURERS

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COURSE SCHEDULE

Lectures and exercises 45 hours

TIME TABLE

Time table is posted on the ZSEM notice-board as well as on the web site <http://www.zsem.hr>.

GENERAL AND SPECIFIC COURSE GOALS

The main goal of the course is to teach students basic concepts of the sets, algebra and real numbers, elementary functions, and equations. The students will be well prepared to follow the topics that will be presented during the other quantitative courses. This academic year the goal “Critical and analytical thinking” will be measured in the context of AOL.

| | <u>General course goals</u> | <u>Specific course goals</u> |
|----|---|---|
| 1. | Students will gain knowledge in modeling, solving and interpreting optimization problems. | Through lectures, exercises, computer work and independent literature reading students will learn mathematical techniques and problem solving skills related to linear programming. |
| 2. | Students will develop their critical and analytical thinking | Through discussions, problem modeling and interpretation of solutions, students will learn how to make decisions based on analytical tools. |
| 3. | Students will learn how to use technology for problem solving | Through using various software and tools students will solve real optimization problems and learn how to create a good interpretation. |

LITERATURE

- Hillier F., Lieberman G., Introduction to operations research, Holden-Day Inc, Oakland, California, 2009.
- Wayne L. Winston, Operations Research: Applications and Algorithms, Duxbury Press, 2003.

GRADING

| Part of the grade | Percentage |
|--------------------------|------------|
| Test 1 | 40% |
| Test 2 | 40% |
| Assignments and seminars | 15% |
| Activity | 5% |

In order to pass the exam, the student needs to score at least 50% of the grade. The students can earn additional points participating in the additional activities at ZSEM that will be announced during the semester. The maximum of additional points is 10%.

To attain a passing grade, student must score at least 30% on each of two tests. If fails on **one** of the tests, student can make up for it in the term of the first general exam with the registration at studomat. Also, if the student is not satisfied with the final grade he/she can repeat one of the tests on his/her choice in the term of the first general exam with the registration at studomat.

The activity points will be assigned by the lecturer at the end of the course.

General Exams

Students are allowed to take the general exam during the whole academic year. General exams must be registered (via studomat) at least three working days prior the exam. The exam can be unregistered via studomat one working day before the exam. The general exam consists of theoretical and problem solving examples (100 points total), and the oral exam. In order to pass, the student needs to score at least 50%. If the student applies for the exam fourth time he/she will be invited to take the oral exam regardless to the result of the written exam.

| Score | Grade |
|------------|------------------|
| 0 – 49 % | Insufficient (1) |
| 50 – 61 % | Sufficient (2) |
| 62 – 74 % | Good (3) |
| 75 – 87 % | Very good (4) |
| 88 – 100 % | Excellent (5) |

STUDENTS OBLIGATIONS

- Attendance is obligatory. Students must attend at least 75% of all lectures.
- Absence justification is regulated by the college rules.
- Students are obliged to use Moodle platform regularly. Moodle is considered to be a basic tutorial tool as well as the basic source of information regarding terms, exams, results and other information connected with the course of study. It is used as a communication “channel” among professor and students. Students are supposed to check the web site on the daily basis, monitor mail folder and take part in discussion sections.
- Cheating on exams is strictly prohibited. Students are not allowed to cheat or allow other students to cheat. This practice will be considered a fraud and punished according to college rules.
- **REGISTERING GRADES:** Student is required to register his/her grade during the terms that are posted on the Moodle along with the exam results. The registration usually takes place within a seven – day period. If the student cannot come personally, he/she can send his index for grade registration via another student or relative. If the student missed the registration process without any notice, grade “insufficient” will be reported in the exam documentation.

COURSE OVERVIEW

If any changes in the course occur, they will be announced in advance during the class.

Week 1

Introduction. Syllabus presentation. Introduction to linear programming (assumptions and modeling).

Week 2

Linear programming modeling, application in business administration and finance.

Week 3

Linear programming modeling, application in business administration and finance.

Week 4

Standard maximum problem. Graphical method. Convex sets.

Week 5

Simplex method.

Week 6

Simplex method.

Week 7

Duality theory and sensitivity analysis.

First midterm exam, ???

Week 8

Network models.

Week 9

Integer programming. Branch and bound method.

Week 10

Scheduling problems.

Week 11

Multiple objectives in linear programming models.

Week 12

Goal programming.

Week 13

Seminars.

Week 14

Seminars.

Week 15

Overview of all topics

Second midterm exam, ????

Kristina Šorić, PhD is a professor at Zagreb School of Economics and Management, Management Department, since March 1, 2012. In the period from 1990 – March 2012, she was working at Faculty of Economics Zagreb, University of Zagreb, where she was the head of Department of Mathematics for eight years. She has been teaching at Faculty of Natural Science, Department of Mathematics Zagreb for five years, Game Theory and Dynamical systems in Economics. She obtained her bachelor degree in mathematics and informatics at Faculty of Natural Science, Mathematical Department, master degree at Faculty of Economics Zagreb and PhD degree in applied mathematics at Department of Pure and Applied Mathematics, University of Padua, Italy. Her main scientific interest is in the field of operational research, optimization, combinatorial optimization, heuristics and metaheuristics for production scheduling, supply chain management and operations management. She is the member of Croatian Operational Research Society (from 2000-2004, president), member of Croatian Mathematical Society (in charge of leading Engineering Section, from December 1, 2011) and was scientific leader of two scientific projects financed by Croatian Ministry of science, education and sport (“Algorithms and heuristics for scheduling problems”, “Algorithms, heuristics and metaheuristics for scheduling problems”). She participated many international and domestic conferences, was chairman of many sessions, organizing committees member, spent many time on her sabbaticals at University of Udine, Italy, Departamento de Engenharia e Gestao, Instituto Superior Tecnico, Lisbon, Portugal, Information and Operations Management Department, Marshall School of Business, Los Angeles, USA and many other institutions abroad. She published many scientific papers, some of them in the journal cited in the relevant basis, European Journal of Operational Research. Kristina has collaborated with industry such as Konzum d.o.o., HEP, Croatian National Bank, hold executive education seminar in Sarajevo, BiH in the field of inventory management for the participants from Konzum BiH, Mercator, Ataco and others as well as in Beograd and Zagreb.