**EASTERN MEDITERRANEAN UNIVERSITY**

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| **COURSE CODE** | *IENG 512* | **COURSE LEVEL** | *Fall 2018-2019* |
| **COURSE TITLE** | Advanced Linear Programming |
| **COURSE TYPE** | *Elective* |
| **LECTURER(S)** | Dr. Béla Vizvári |
| **CREDIT VALUE** | 3 credits | **ECTS VALUE** |   |
| **PREREQUISITES** | - |
| **COREQUISITES** | - |
| **DURATION OF COURSE** | 1 semester |
| **WEB LINK** | - |
| **CATALOGUE DESCRIPTION**Geometry of LP and Simplex Method. Duality and its implications. Sensitivity. Simplex forms: Revised Simplex, dual Simplex etc. LU factorization. Transportation and transshipment problems, assignment problem. Decomposition Methods. Networks. Problems with upper bounds. Numerical stability and computational efficiency. Karmarkar's method. |
| **AIMS & OBJECTIVES**The main aim of this course is to provide students with the necessary knowledge of linear programming: * Basics of convex geometry.
* Simplex method.
* Duality.
* The use of optimization in engineering.
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| **GENERAL LEARNING OUTCOMES (COMPETENCES)**On successful completion of this course, all students will have developed **knowledge** and **understanding** of:* Methods of linear programming.

On successful completion of this course, all students will have developed **their skills in**:* Carry out calculation in linear programming.
* Applications of linear programming.

On successful completion of this course, all students will have developed their appreciation of and respect for **values and attitudes** regarding the issues of:* Convex analysis.
* The use of high dimensional geometry in engineering.
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| **GRADING CRITERIA**Grading is based on homeworks, one midterm paper and a final paper and voluntary home work.  |
| **RELATIONSHIP WITH OTHER COURSES**N/A |
| **LEARNING / TEACHING METHOD**Lectures, problem-sheet assignments, tutorials. |
| **ASSIGNMENTS** |
| **METHOD OF ASSESSMENT**Midterm : 30%Home works 30%Final : 40%**+** voluntary home works (They are voluntary both for teacher and students) |
| **ATTENDANCE**1. Attendance is mandatory. Any student who has poor attendance and/or misses an examination without providing a valid excuse will be given **NG** grade.
2. Students missing an examination should provide a valid excuse within three days following the examination they missed. One make-up examination will be given at the end of the semester after the final examination period.
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| **TEXTBOOK/S**Any linear programming textbook can be used. I follow my own way. It I important that I discuss only the complete simplex tableaux and don’t accept the reduced version. Similarly, the two phase simplex method is discussed and the big-M method is not accepted. |
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| **CONTENT & SCHEDULE**Lectures will be held on *Mondays (10:30-13:20) in IE-E201.* The lecture topics within the semester are as in the following schedule although minor changes are possible:

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| **WEEK** | **TOPICS** |
| 1 |  Linear Programming Models in Engineering |
| 2 | Introduction and Convex Analysis |
| 3 | Polyhedral Sets |
| 4 | The Geometry of the Simplex Method |
| 5 | Algebraic Explanation of the Simplex Method |
| 6 | Duality I |
| 7 | Duality II |
| 8 | Sensitivity Analysis |
| 9 | **Midterm Exam** |
| 10 | The Transportation Problem |
| 11 | The Assignment Problem |
| 12 | Networks in General |
| 13 | Interior Point Methods |
| 14 |  Contemporary Issues I |
| 15 |  Contemporary Issues II |
| 16 | **FINAL EXAM WEEK** |

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| **PLAGIARISM**This is intentionally failing to give credit to sources used in writing regardless of whether they are published or unpublished. Plagiarism (which also includes any kind of cheating in exams) is a disciplinary offence and will be dealt with accordingly.) |