



**Subject: Linear Algebra and Probabilities**

**SYLLABUS**

**Topic 1. Introductory topics**

- 1.1. Review of basic Linear Algebra
- 1.2. Matrix and vector algebra
- 1.3. Linear independence of vectors; geometric interpretation of vectors
- 1.4. The rank of a matrix
- 1.5. Main results on linear systems
- 1.6. The Leontief Model

**Topic 2. Eigenvalues, eigenvectors**

- 2.1. Eigenvalues
- 2.2. Eigenvectors
- 2.3. Diagonalization
- 2.4. Spectral decomposition

**Topic 3. Matrix decompositions**

- 3.1. Cholesky decomposition
- 3.2. Singular value decomposition

**Topic 4. Quadratic forms**

- 4.1. The matrix associated to a quadratic form
- 4.2. The nature of a quadratic form

**Topic 5. Linear programming**

- 5.1. Graphical method; graphical method by using Excel
- 5.2. The Simplex method; the Solver from Excel
- 5.3. Sensitivity analysis, duality
- 5.4. Applications

## References:

1. Sydsæter K., Hammond P., *Essential Mathematics for Economic Analysis*, Massachusetts: Prentice Hall, 2002
2. Sydsæter K., Hammond P., Seierstad A., Strøm A., *Further Mathematics for Economic Analysis*, Boston: Prentice Hall, 2005
3. Curt P., Filip D. A., *Quantitative Methods in Economics*, Editura Mediamira, Cluj-Napoca, 2009
4. Downing D., Clark J., *Quantitative Methods*, Barron's business review series, 1988
5. Render B., Stair, R.M. JR., *Quantitative Analysis for Management*, third edition, Allyn and Bacon, Inc., 1988