
COURSE NAME	Review Course in Maths and Statistics: <i>Calculus and Linear Algebra</i>
PROFESSOR	Prof. Eulalia Nualart TA: Sébastien Willis
PROGRAM	<i>Brush-up Courses 2017 - Master Program in Economics and Master Program in Finance</i>
COURSE OUTLINE	Part 1: Linear Algebra 1. <i>Vectors and matrices</i> a. Vector spaces b. Subspaces c. Linear transformations d. Matrices and matrix operations 2. <i>Determinants</i> a. Basic rules b. Inverse of a matrix c. Cramer's rule 3. Eigenvalues, eigenvectors a. Characteristic equation b. Diagonalization of a matrix c. Rank and trace of a matrix d. Spectral theorem e. Quadratic forms Part 2: Analysis 1. <i>Basics</i> a. Limits b. Continuity c. Differentiation, Taylor's formula d. Integration 2. <i>Functions of several variables</i> a. Partial derivatives b. Tangent planes

- c. Implicit defined functions
- d. Homogenous functions
- e. Implicit function theorem

3. *Optimization*

- a. Unconstrained maximization
- b. Convex and concave functions
- c. The Lagrange multiplier method
- d. The Kuhn-Tucker conditions

4. *Differential equations*

- a. First-order differential equations
 - b. Separable equations
 - c. Linear differential equations
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REFERENCES

1. Werner, F. and Sotskov, Y. N. *Mathematics of Economics and Business*. Routledge, 2006.
2. Sydsaeter, K. and Hammon, P.J. *Mathematics for Economic Analysis*. Prentice Hall, 1995.
3. Aleskerov, F., Ersel, H. and Piontkovski, D. *Linear Algebra for Economists*. Springer, 2011.