

Math II 2016: Syllabus

Lecturer: Jens Josephson (jens.josephson@ne.su.se)

Teaching Assistant: Sirius Dehdari (sirus.dehdari@iies.su.se)

Administrator: Anne Jensen (anne.jensen@ne.su.se)

The course covers fundamental topics in linear algebra and probability theory. In the linear algebra part, concepts such as linear dependence, linear function, matrix, matrix multiplication, inverse matrix, determinant, eigenvalue, eigenvector, definiteness, idempotent matrix, projection matrix, and orthogonal projection matrix are defined. Results such as the Fundamental Theorem of Linear Algebra, Cramer's rule, and the Spectral Theorem are discussed.

In the probability part concepts such as sample space, conditional probability, independence, expected value, variance, and moment-generating function are introduced. The most common discrete and continuous distributions are covered, including the bivariate normal distribution. Finally, various forms of convergence, the central limit theorem, the law of large numbers, the delta method, and maximum likelihood estimation are discussed.

The course has 10 lectures and 4 practice sessions. The examination consists of a final exam (90%) and 4 problem sets (10%).

References:

Berlin, Martin: *Working with R*, preliminary manuscript, 2016.

Björkström, Anders: *Lecture Notes for Mathematics II*, 2013.

Green, William H.: *Econometric Analysis*, 7th Edition, Prentice-Hall, 2012.

Hansen, Bruce: *Econometrics*, January 14, 2016 (<http://www.ssc.wisc.edu/~bhansen/econometrics/>).

Hogg, Robert V., and Elliot A. Tanis: *Probability and statistical inference*, 9th Edition, Pearson, 2015.

Nicholson, W. Keith: *Linear Algebra with Applications*, 6th Edition, McGraw Hill Higher Education, 2009.

Ramanathan, Ramu: *Statistical Methods in Econometrics*, Academic Press, 1993.

Ross, Sheldon: *A First Course in Probability*. 8th Edition. Pearson Prentice Hall, 2009.

Weibull, Jörgen W.: *Lecture Notes in Mathematics*, August 21, 2016.