

Syllabus

Course title	Pre-session for Finance: Mathematics and Excel
Instructor	Reguly, Agoston
Email	reguly_agoston@phd.ceu.edu
Office hours	by appointment
Credits	0 US credits (0 ECTS credits)
Module	Orientation
Term	0 week and Pre-session 2020-2021
Course level	Master's
Prerequisites	None
Course drop	No course drop. For the Regulations of the MS in Finance program, please check here .

1. COURSE DESCRIPTION

Content. This course provides an overview of basic and more advanced concepts in mathematics and Microsoft Excel.

Relevance. All the material provided by this course is required to complete subsequent courses.

2. LEARNING OUTCOMES

Key outcomes.

- Upon the completion of the course students will be familiar with the basics of linear algebra, calculus probability theory and statistics.
- They will also accumulate knowledge on general usage of Microsoft Excel such as data management, using functions, and add-ins as the Solver and Analysis ToolPak.

Other outcomes. The course will also help develop skills in the following areas:

Learning Area	Learning Outcome
Critical Thinking	Understand and use basic math, informatics and finance jargon. Ability to categorize different problems and have an idea how to approach to the solution.
Quantitative Reasoning	Basics of linear algebra, calculus probability theory and statistics.
Technology Skills	General usage of Microsoft Excel such as data management, using functions, and add-ins as the Solver and Analysis ToolPak.
Interpersonal Communication Skills	Students are encouraged to study in groups and to solve the optional homework together.
Management Knowledge and Skills	-
Cultural Sensitivity and Diversity	-
Ethics and Social Responsibility	-

3. READING LIST

- Knut Sydsaeter and Peter J. Hammond [SYD] - Mathematics for Economic Analysis

- Dirk P. Kroese [KROESE] - A Short Introduction to Probability ([available here](#))
- John Walkenbach [WB] - Excel 2013 Formulas
- [Excel Easy Webpage](#) [EE]

All the other course material will be published at the [ceulearning](#) website.

4. TEACHING METHOD AND LEARNING ACTIVITIES

This should be a brief description of activities used during the course to achieve the desired learning outcomes (e.g. seminar-style classroom discussions, lectures, student presentations, case studies, etc.).

The course will involve a mix of

- Lectures to present mathematical tools and concepts in Microsoft Excel.
- Seminar-type classroom to solve specific mathematical and Microsoft Excel problems together. Through this we demonstrate the use of the learned theories and concepts.
- Optional homework to practice through extra problems and deepen the student's knowledge.

5. ASSESSMENT

Grading will be based on the total score out of 100, in line with CEU's standard grading guidelines.

- Hand in assignment with Microsoft Excel (must be completed 75% to pass). Students get the assignment on 1st of October 18:00 and need to upload to ceulearning until 4th of October, 23:59.
- Written exam contains mathematics problem set, on September 28, 18:00-19:30; N15 103 (Tiered). Must be completed 50% to pass, can bring scientific calculator.
- Participation in class is required (min. 75% of attendance), unless student passed the optional opt out exam before course starts.

The course may be 'opt-out' in case of a successful waiver examination. Between 21st (20:00) and 22nd, (20:00) of August students have the possibility to complete a math and/or a Microsoft Excel examination via ceulearning. Each one of the exam is successful if the student reaches more than 75% of the points.

6. TECHNICAL REQUIREMENTS

Having laptops on the informatics sessions is highly advised.

7. TOPIC OUTLINE AND SCHEDULE

Course schedule and materials for each session

1. Elementary algebra [SYD Appendix A]: Powers, square roots, rules of algebra (commutativity, distributivity, associativity), factors, fractions, simple equations, inequalities, quadratic equations.
2. Functions of one variable [SYD 2.2, 2.5, 3.1, 3.3, 3.4, 3.5, 3.6, 8.1, 8.2, 8.3]:
Linear functions, quadratic functions, polynomials, power functions, exponential functions, logarithmic functions.
3. Calculus [SYD 4.1, 4.2, 4.4, 4.5, 4.6, 4.7, 5.1, 5.2, 6.1, 6.2, 6.3, 6.4, 6.5, 10.1, 10.2, 10.3, 15.1, 15.3, 15.5, 17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7, 17.8, 17.9, 18.1, 18.2, 18.4, 18.5]: Limits, continuity, differentiability, differentiation, minima and maxima, partial derivatives, integration, multivariate optimization, constrained optimization (lagrangian), infinite sequences, series. (Also good to know: chain rule, L'Hopital's rule)

4. Linear algebra [SYD 12.1, 12.2, 12.3, 12.4, 12.6, 12.7, 12.8, 12.9, 13.1, 13.2, 13.3, 14.1, 14.2, 14.4]: Vectors, scalar product, systems of linear equations, matrices, matrix operations (multiplication, transpose), determinant, eigenvalues, eigenvectors, linear independence. (Also good to know: Gauss elimination, rank and the number of solutions)

5. Probability theory [KROESE 1, 2, 3]: Sample space, events, probability, conditional probability, independence, Bayes' rule, law of total probability, random variables, probability distributions (Bernoulli, binomial, uniform, normal, lognormal, power-law, exponential), expected value.

6. Microsoft Excel [WB: 1, 2, 4, 5, 8, 18; EE: Introduction, Basics 1-5, Functions 1-6, 11, Data Analysis 1-5, 8, 9]: Workbook and worksheets, formatting, data management and visualization, formulas and functions (descriptive, logical, selection), pivot tables, automatizing with macros, optimization with solver, statistical tools with Analysis ToolPak

- Further useful links: [Excel-Homelearn](https://www.homeandlearn.co.uk/excel2007/Excel2007.html) - <https://www.homeandlearn.co.uk/excel2007/Excel2007.html>, [Microsoft Official Page](#), [Excel Campus](#)

8. SHORT BIO OF THE INSTRUCTOR

I am a fifth-year Economics PhD student at the Department of Economics and Business. I have worked more than three years at the Hungarian Government Debt Management Agency as an expert analyst. My research topics are in econometrics, policy evaluation with machine learning techniques and optimal survey designs.