1. <u>Name of Course:</u> **Pre-session Course in Mathematics**

2. <u>Lecturer</u>: **Pál Hegedűs**

3. No. of Credits: **0**, and no. of ECTS credits: **0**

4. <u>Semester or Time Period of the course</u>: **Pre-session of AY 2016-2017**

5. Prerequisites: **none**

6. <u>Course Level</u>: **introductory**

7. <u>Brief introduction to the course</u>:

The course will cover the basic mathematical background needed for economics MA students. While our topic is the mathematical theory, albeit application oriented, still some applications in economics will be touched.

8. <u>The goals of the course</u>:

The chief goal of the course is to refresh and expand the mathematical knowledge expected by the regular economics courses. A second goal is to make the student more comfortable with the mathematical background and discover interconnections within it.

9. <u>The learning outcomes of the course</u>:

The students will learn the basic notions and results of calculus, real analysis, linear algebra and some statistics. They will gain expertise in using the theory in various, but simple contexts of economics. Some expertise in problem solving will also be earned.

10. <u>More detailed display of contents</u>. (Week-by-week)

1. Real and complex numbers. Basic functions, basic algebra. Vectors and matrices. Operations on matrices and vectors. Inverse matix, determinant.
2. Limit of a sequence and of a functions. Continuity. Differentiation, derived function. Rules of differentiation, chain rule. Understanding the properties of the function, its graph. Function calculus.
3. Indefinite integral, basic rules of integration. Definite integral and its applications. Functions of several variables, their graphs. Partial derivatives, gradients, total derivatives, chain rule. Hessian of a function. Convexity, concaveness.
4. Implicit function theorem, level curves. Unconstrained and constrained optimisation. Statistics.

Optional topics:

    Elements of probability theory.

Reading list:
Carl Simon and Lawrence Blume: Mathematics for Economists.
Rangarajan Sundaram: A First Course in Optimization Theory.
K. Sydsaeter Hammond: Mathematics for Economic Analysis.

Teaching format: Lectures and seminars. Each week there will be four 3-hours-long lectures and three 2-hours-long seminars. The seminars will be devoted to problem solving and discussion.

11. Assessment:

Attendance at the lectures and seminars is recommended, but non-mandatory.

Homework: are assigned regularly and discussed at the seminars.

Tests and Grading: There will be a final test at the end of the course, on the 19th of September. The passing threshold is 50%.

12. Such further items as assessment deadlines, office hours, contact details etc are at the discretion of the department or the individual.

Office hours: by appointment

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