UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2014/15/1
Course:	Dynamic Systems
Code:	VEGTMAM144D
Responsible department:	Department of Mathematics
Department code:	MIMA
Responsible instructor:	dr. Mihály Pituk

Course objectives:

Introduction to mathematicals methods and tools which are needed for the investigation of dynamical systems and their appplications in economics.

Course content:

- Ordinary differential equations
- Initial value problem, existence, uniqueness and continuability of the solutions
- Stability notions
- Autonomous equations
- Linear differential equations (n-th order scalar equations, homogeneous and nonhomogeneous equations, stability criteria)
- Nonlinear differential equations (stability theorems, linearizations)
- Applications (Domar's growth model, Solow's neoclassical growth model, Phillips' stabilization model, the Walras model, the Hicks-Samuelson model)
- Difference equations and discrete models
- First order equations
- Second and higher order linear difference equations (the method of undetermined coefficients)
- Stability theory
- Linear systems of difference equations (homogeneous and nonhomogeneous equations, stability)
- Stability of nonlinear systems by the first approximation
- Applications (Goodwin's model, Samuelson's acceleration model, Hick's accerleration model)

Requirements, evaluation and grading:

Based on written midterm exams.

Required and recommended readings:

Hatvani L., Krisztin T., Makay G.: Dinamikus modellek a közgazdaságban, Polygon, Szeged, 2001. Sydsaeter,

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Required and recommended readings:

Hammond, Seierstad, Strom: Further Mathematics for Economic Analysis, Prentice Hall, 2005. Chiang: Elements of Dynamic Optimization, McGraw-Hill, New York, 1992. Kamien-Schwartz: Dynamic Optimization: the Calculus of Variations and Optimal Control in Economics and Management, Elsevier, Amsterdam, 1991.