Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Advanced Theories: Finance, Macroeconomics and Microeconomics (Module 2: Macroeconomic Theory)
Course code	**29068**
Scientific sector	SECS-P/01
Degree	PhD in Economics and Finance
Semester and academic year	2nd, academic year 2022/2023
Year	1st
Credits	9
Modular	yes

Total lecturing hours	10
Total office hours	Not foreseen
Total exercise hours	Not foreseen
Attendance	required
Prerequisites	-
Course page	-
Specific educational objectives	In this course, you will learn the basic analytical tools to be able to handle dynamic models in continuous time, in particular in a macroeconomic context, and to apply dynamic methods to new problems.

Lecturer	Prof. Dr. Stefan F. Schubert
Scientific sector of the lecturer	SECS-P/01
Teaching language	English
Office hours	-
Lecturing assistant	none
List of topics covered	1. Differential Equations, Eigenvalues and Eigenvectors 2. Systems of Differential Equations 3. Dynamic Optimization – Control Theory 4. Application of Dynamic Optimization to the closed economy: The Ramsey-Model 5. Application of Dynamic Optimization to the open economy: The Small Open Economy
Teaching format	Frontal lectures

Learning outcomes	You will learn some basic methods to handle dynamic problems in continuous time. We will stress the methods, rather than their mathematical derivations. We will start with an intuitive discussion of how to solve a linear differential

equation. Then, we will briefly review some basic concepts of matrix algebra. These concepts will then be applied for solving linear dynamic systems. A linearization technique will be discussed, too. Finally, we will turn to dynamic optimization in continuous time (control theory) and will discuss necessary conditions for optimality. We then apply the acquired methods to a set of well-known dynamic macroeconomic models, based on the representative agent approach, both for the closed economy (Ramsey Model) and for the open economy (Small Open Economy Model). These models serve as a starting point to understand and to build state of the art models, e. g. dynamic stochastic general equilibrium (DSGE) models.

Assessment	Written exam
Assessment language	English
Evaluation criteria and criteria for awarding marks	

Required readings	None
Supplementary readings	**Literature on economic applications:** Turnovsky, Stephen J.: Methods of Macroeconomic Dynamics, 2nd ed., chapter 8, chapter 11, 2000, MIT Press Turnovsky, Stephen J.: International Macroeconomic Dynamics, chapters 2 and 3, 1997, MIT Press Further literature will be indicated during lectures. **Literature on mathematical methods:** Chiang, Alpha C: Fundamental Methods of Mathematical Economics, part 5, 3rd ed., 1984, McGraw-Hill Chiang, Alpha C.: Elements of Dynamic Optimization, 1992, McGraw-Hill Hoy, Michael, John Livernois, Chris McKenna, Ray Rees and Thanasis Stengos.: Mathematics for Economists, chapter 21, chapter 24, chapter 25, 1996, Addison-Wesley Takayama, Akira: Analytical Methods in Economics, 1994, Harvester Wheatsheaf Dixit, Avinash: Optimization in Economic Theory, 2nd ed., 1990, Oxford University Press Léonard, D. and N. van Long: Optimal Control Theory and

	Static Optimization, 1992, Cambridge University Press
	Brannan, James R. and William E. Boyce: Differential Equations. An Introduction to Modern Methods and Applications, various editions, John Wiley & Sons