**SYLLABUS FOR THE COURSE ADVANCED MATHEMATICS**

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| **Course Basic Information** | | | |
| **Academic Unit:** | Faculty of Economics | | |
| **Course title:** | Advanced Mathematics | | |
| **Level:** | Master studies | | |
| **Course Status:** | Obligatory | | |
| **Year of Study:** | 1st Year, 1st Semester | | |
| **Number of Classes per Week:** | 3 | | |
| **ECTS Credits:** | 6 | | |
| **Time /Location:** |  | | |
| **Teacher:** | Nimete Berisha; Ajet Ahmeti | | |
| **Contact Details:** | [nimete.berisha@uni-pr.edu](mailto:nimete.berisha@uni-pr.edu);  ajet.ahmeti@uni-pr.edu | | |
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| **Course Description:** | The course has two parts: Matrix algebra and matrix diagonalization and Differential and difference equations and systems.  After a brief review of the elementary operations with matrices, some fundamental concepts for obtaining the canonical form of a matrix are given.  Definition and illustration of differential and difference equations concepts with examples coming mainly from economics. The main tools of resolution are given, and special emphasis on the analysis of the qualitative behavior of the solutions is done. The techniques are applied to some classical economic models. | | |
| **Course Goals:** | The module provides the quantitative instruments that are needed to pose and analyze economic problems with the aid of a formal model. | | |
| **Expected Learning Outcomes:** | By the end of the module students should be able to:   * Understand basic concepts of matrices and algebra of matrices. * Analyze dynamic economic models. * Pose and solve differential and difference equations and systems, and styudy in detail the qualitative behavior of the solutions. * Apply all the above concepts to economic problems. * Address economic problems by means of abstract models. * Solve the above formal models. * Interpret and classify the different solutions and apply the appropriate conclusions to social contexts. * Use the basic tools that are need in the modern analysis of economic problems. | | |
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| **Student Workload (should be in compliance with student’s Learnign Outcomes)** | | | |
| **Activity** | **Hours** | **Day/ Week** | **Total** |
| Lectures | 3 | 8 | 24 |
| Theory/ Lab Work/Exercises | 3 | 7 | 21 |
| Practical Work |  |  |  |
| Consultations with the teacher | 1 | 14 | 14 |
| Field Work |  |  |  |
| Test, seminar paper | 2 | 5 | 10 |
| Homework | 3 | 13 | 39 |
| Self-study (library or home) | 2 | 15 | 30 |
| Preparation for final exam | 3 | 1 | 3 |
| Assessment time (test, quiz, final exam) | 3 | 3 | 9 |
| Projects, presentations, etc. |  |  |  |
| **Total** |  |  | **150** |
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| **Teaching Methods:** | The way of learning will be three hours of lectures for 15 weeks. Lectures are held according to basic literature, In each segment of the lecture and the respective exercises, students are activated with additional comments, questions and explanations as a result of the questions. The level of discipline is maintained high so that eventually unquestionably students will not hinder those who are actively focused and interested.  Consultations are scheduled according to the above schedule. However, additional consultations may be arranged in agreement with the professor if necessary. | | |
| **Assessment Methods:** | Individual assignments completed in class 30%; Individual assignments completed at home 30%;  Exam 40%. | | |
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| **Primary Literature:** | 1. A. C. Chiang, K. Wainwright. *Fundamental methods of mathematical economics,* Mc Graw Hill, 2006 2. Ajet Ahmeti: Matematika për ekonomistë, Prishtinë, 2012. 3. Alpha, C. Chiang:Fundamental methods of Mathematical Economics,McGraw-Hill International Edition | | |
| **Additional Literature:** | K. Sydsaeter, P. J. Hammond. *Mathematics for economic analysis,* Prentice Hall, 1995. | | |

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| **Designed teaching plan** | |
| **Week** | **Title of the Lecture** |
| ***Week 1:*** | Equilibrium Analysis in Economics |
| ***Week 2:*** | Matrix and Vector Algebra |
| ***Week 3*:** | Determinants and Inverse Matrices |
| ***Week 4:*** | Functions of Many Variables |
| ***Week 5:*** | Tools for Comparative Statics |
| ***Week 6*:** | Optimization: A Special Variety of Equilibrium Analysis |
| ***Week 7:*** | Multivariable Optimization |
| ***Week 8:*** | Optimization with Equality Constrains |
| ***Week 9:*** | Economic Dynamics and Integral Calculus |
| ***Week 10:*** | Continuous Time: First-Order Differential Equations |
| ***Week 11*:** | Higher-Order Differential Equations |
| ***Week 12*:** | Discrete Time: First-Order Difference Equations |
| ***Week 13*:** | Higher-Order Difference Equations |
| ***Week 14*:** | Linear Programming |
| ***Week 15*:** | Nonlinear Programming |

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| **Academic Policies and Code of Conduct** |
| *We start and finish class on time.*  *Tools used during class must be cleaned and stored away at the end of class.*  *Mobile/smart phones, and other electronic devices (e.g. iPods) must be turned off (or on vibrate) and hidden from view during class time.*  *Laptop and tablet computers are allowed for quiet use only; other activities such as checking personal e-mail or browsing the Internet are prohibited.* |

**Note | If a student has more than 3 class assignements evaluated below 50% he/she loses the right on taking the final exam. Evaluation is done from 0-100 %.**