**SYLABUS**

**Year of Study** 2021-2023

* 1. Course Description – General Information

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| COURSE NAME | Advanced Mathematical Economics |
| COURSE CODE | E/IIE/B.4 |
| COLLEGE | College of Social Sciences |
| INSTITUTE | Institute of Economics and Finance |
| FIELD OF STUDY | Economics / International Business – Cross Cultural Aspects |
| QUALIFICATION LEVEL | Master's degree |
| PROFILE | General academic |
| STUDY MODE | Full-time |
| YEAR AND SEMESTER | II/3 |
| COURSE FORMAT | Major contents group |
| COURSE COORDINATOR | Barbara Fura, PhD |
| COURSE INSTRUCTOR(S) | Barbara Fura, PhD |
| LANGUAGE OF INSTRUCTION | English |

1.2. Course organisation –learning format and number of hours, ECTS.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lecture | Tutorial | Conver. | Lab. | Seminar | ZP | Practice | Other (spec.) | **ECTS credit pts.** |
| 15 | 15 |  |  |  |  |  |  | 3 |

1.3. Method of teaching

X traditional

☐ inclusive of distance learning

1.4. Final assessment type (according to the study plan): (exam, graded credit, ungraded credit)

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| Exam |

2. Prerequisites

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| Familiarity of issues carried out under subjects: mathematics, microeconomics, and macroeconomics. Ability to analyze economic problems with the use of quantitative methods. |

1. Objectives , teaching outcomes, description and didactic methods
   1. COURSE OBJECTIVES

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| C1 | Acquiring the ability to formulate economic problems in mathematical language, and to solve them. |
| C2 | Developing skills to understand interdependences described by mico- and macroeconomic quantifiable variables. |
| C3 | Acquiring skills of understanding of economic theory in terms of mathematical axiomatic. |

3.2 Learning Outcomes

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| EK (Learning Outcomes) | The Intended Student Learning Course Outcomes | Reference to learning outcomes with regard to the field of study (KEK) |
| EK\_01 | Shows significant relations between economic and mathematical sciences. Recognizes modern concepts of economic theory formulated in the language of mathematics concerning micro- and macroeconomic phenomena. | K\_W01 |
| EK\_02 | Presents economic problems in mathematical language and finds their solutions. Analyzes the phenomena and processes taking place in the economy using quantified micro- and macroeconomic variables. | K\_U01  K\_U06 |
| EK\_03 | Understands the importance of mathematical economics for the development of economic sciences. Is aware of the advantages and limitations of the use of mathematical models and methods in economics. | K\_K01  K\_K02 |
| EK\_04 | Exhibits an attitude to own individual activities in learning and organizing own work in the process of familiarization and applications of mathematical economics models. | K\_K01 |

* 1. **COURSE DESCRIPTION**

1. Lecture contents

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| Mathematical theory of demand. |
| Mathematical theory of production. |
| Market equilibrium. |
| Short and long-term strategies of companies in neoclassical theory. |
| Warlas general equilibrium. |
| Models of exogenous and endogenous growth. Rules accumulation of growth factors in mathematical terms. Long-term sustainability of growth. |
| Modelling of risk and uncertainty in business. |

1. Contents of the tutorials, seminars, etc.

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| Elements of the mathematical theory of demand. Preferences and utility functions. Applications of marginal calculus. Solving the consumer problem. |
| Algorithmic modeling of market equilibrium in the sense of Arrow-Hurwicz. |
| Theory of production. The basic factors characterizing the efficiency of production and the isoquants of elementary production function − examples. |
| Short and long-term strategies of enterprises in conditions of perfect competition − examples. |
| Models of exogenous and endogenous growth − examples and solving problems. |

* 1. TEACHING METHODS

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| Lecture with multimedia presentation. Tutorials with solving of problems using mathematical tools, discussion. Individual and teamwork. |

1. Methods And Assessment

4.1 The methods of verification of learning outcomes

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| Learning outcomes (symbol) | Grading systems for teaching outcomes (i.e.: test, oral examination, written examination, essay, project, report, observation during classes) | Learning format (lecture, tutorial, …) |
| EK\_01 | observation during classes, test, written examination | lecture, tutorial |
| EK\_02 | test, written examination | lecture, tutorial |
| EK\_03 | observation during classes, test, written examination | lecture, tutorial |
| EK\_04 | observation during classes, test, written examination | lecture, tutorial |

4.2 Assessment and credit requirements

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| The condition for completing the course is to receive a pass of tutorials and passing the exam. Tests and exam grades are determined on the basis of the number of points obtained according to schema: [0% -50%) - 2.0, [51% -64%) - 3.0, [64% -73%) - 3.5, [73% - 82%) - 4.0, [82% -91%) 4.5, [91% -100%)] - 5.0. |

5. Total Student Workload Needed To Achieve Expected Learning Outcomes With Regard To Time And ECTS Credit Points

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| Activity | No. of hours/Student workload |
| Hours of classes according to Study Plan | 30 |
| Consultations (attending the teacher’s office hours) | 4 |
| Own work (tests, exam, tutorial preparation) | 41 |
| TOTAL NUMBER OF HOURS | 75 |
| **ECTS CREDITS IN TOTAL** | **3** |

1. Internship

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| Number of hours | - |
| Rules and forms of internship | - |

1. Course Literature

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| Primary:   1. A.C. Chiang, *Fundamental* *Methods of Mathematical Economics*, McGraw-Hill, Inc., 1992. 2. V. Shapoor, *Principles of Mathematical Economics*, Atlantis Press, 2015. |
| Supplementary:   1. E.T. Dowling, *Mathematics for Economists*, McGraw-Hill Book Company,1992. 2. M. Carter, *Foundations of Mathematical Economics*, Massachusetts Institute of Technology,London,2001. 3. B.Fura, M. Fura, *Didactics of Mathematics*, Optimization of consumer preferences, 12(16), p.61–68, 2017. |

Department head’s or authorized person signature