Description of Discipline

Title of Discipline: ***Higher Mathematics***					
Semester	Duration	Type of Discipline	ECTS Credits	Academic Workload	Language of Instruction
1	180 hrs.	compulsory	6	50 hours of classroom training, 130 hours of self-study	Ukrainian

Learning Outcomes	Teaching Methods	Evaluation Methods
LO5. To apply analytical and methodological tools to substantiate decisions.	Lectures, taking notes, practical classes, exercises, tasks and practice	Oral evaluation, final tests, reports, graphic methods, pass-fail test
LO7. The ability to apply economic and mathematical methods and models to solve economic problems.	Lectures, presentations, watching videos, exercises, tasks, practice	Oral evaluation, final tests, reports, graphic methods, pass-fail test
LO10. To apply theoretical knowledge to solve practical problems and interpret the results properly.	Practical classes, exercises, problem educational tasks and presentation	Written evaluation, colloquium, pass-fail test
LO15. To use information and communication technologies to solve social-economic problems, prepare and submit analytical reports.	Lectures, taking notes, illustration, presentation, instructing, exercises and tasks	Evaluation using a computer, reports, pass-fail test
LO16. The ability of abstract thinking, analysis and synthesis to identify key characteristics of economic systems of different levels.	Lectures, presentation, watching videos, exercises, tasks, practice	Oral evaluation, final tests, reports, graphic methods, pass-fail test

Title of Discipline / **Higher Mathematics**				
Semester	**Duration**	**Type of Discipline**	**ECTS Credits**	**Student Workload**
1,2	360	mandatory	12	110 hours of teaching, 250 hours of self-study

Requirements for Participation	**Type of examination (oral, written, term paper, etc.)**	**Methods of teaching and learning (lectures, seminars, etc.)**	**Discipline Coordinator**
Complete general secondary education	Written exam, written pass-fail test	Lectures, practical classes	Baliunov O.

Learning Outcomes

GC4. Ability to apply knowledge in practical situations.
GC5. Ability to communicate in the state language both orally and in writing.
GC7. Skills in the use of information and communication technologies.
GC8. Ability to search, process and analyze information from various sources.

SC6. Ability to apply economic and mathematical methods and models to solve economic problems.
SC7. Ability to use computer technology and data processing software to solve economic problems, analyze information and prepare analytical reports.
SC9. Ability to predict socio-economic processes on the basis of standard theoretical and econometric models.
SC10. Ability to use modern sources of economic, social, managerial, accounting information for the preparation of official documents and analytical reports.
SC27. Ability to prepare information, choose the type of model, calculate its parameters and assess adequacy.

PLO5. Apply analytical and methodological tools to substantiate proposals and make management decisions by various economic agents (individuals, households, enterprises and public authorities).
PLO7. Apply appropriate economic and mathematical methods and models to solve economic problems.
PLO8. Explain the models of socio-economic phenomena in terms of fundamental principles and knowledge based on an understanding of the main directions of development of economics.
PLO10. Apply the acquired theoretical knowledge to solve practical problems and meaningfully interpret the results.
PLO15. Use information and communication technologies to solve socio-economic problems, prepare and present analytical reports.
PLO16. Be able to think abstractly, apply analysis and synthesis to identify key characteristics of economic systems at different levels, as well as the behavior of their subjects.
PLO27. Ability to apply knowledge and understanding to solve problems that are characteristic of the economy.
PLO31. Master the skills of oral and written professional communication in state and foreign languages.
PLO36. Ability to present and discuss the results obtained and transfer the acquired knowledge.

Contents

MODULE 1. LINEAR ALGEBRA

Topic 1. Components of matrix theory and determinants.
Topic 2. Матриці та дії над ними. Matrices and operations on matrices.
Topic 3. General theory of systems of linear algebraic equations. Elements of matrix analysis

MODULE 2. ELEMENTS OF ANALYTIC GEOMETRY AND VECTOR ALGEBRA

Topic 1. Elements of vector algebra
Topic 2. Elements of analytic geometry.

MODULE 3. INTRODUCTION TO MATHEMATICAL ANALYSIS

Topic 1. Function
Topic 2. Limit of a sequence and limit of a function
Topic 3. Continuous function

MODULE 4. DIFFERENTIAL CALCULUS OF FUNCTIONS OF ONE VARIABLE

Topic 1. Derivative. Differentiation rules Topic 2. Basic theorems of differential calculus

Exemplary Literature
Primary 1. Davidov M.O. Course of mathematical analysis. - Part 1. Functions of one variable. - K .: VSh, 1990. - 384 p. - Part 2. Functions of many variables. Differential equations. - K .: VSh, 1991. - 368 p. - Part 3. Theory of functions of real and complex variables. - K .: VSh, 1991. - 350 p. 2. Marmoza A.T. Workshop on mathematical statistics. - K .: VSh, 1990. - 190 p. 3. Mikhailenko V.M., Fedorenko N.D. Special sections of mathematics. - K .: VSh, 1992. - 216 p. 4. Collection of individual tasks in higher mathematics. / Under the general. ed. of A.P. Ryabushko. - Minsk.: Higher. school - Part 1. - 1990. - 270 p. - Part 2. - 1991. - 352 p. 5. Shkil M.I., Kolesnik T.V. Higher Mathematics. In 3 volumes - K., Lybid, 1994. - Vol. 1. - 280 p. - Vol. 2. - 352 p. - Vol. 3. - 352 p. **Supplementary** 1. Tasks for independent work on the theory of probabilities for students of all specialties / Compiled by: L.A. Ostrovetsky, E.I. Yurchenko. - K .: KPI, 1989. - 28 p. 2. Linear algebra: Individual tasks for students of all specialties / S.P. Kornienko, V.M. Los. - Chernihiv: ChSTU, 2004. - 31 p. 3. Linear algebra: Methodical instructions for students of all specialties / S.P. Kornienko, V.M. Los. - Chernihiv: ChSTU, 2004. - 42 p. 4. Linear algebra. Methodical instructions for performing calculation and graphic works / S.P. Kaznadei, V.P. Murashkovska. - Chernihiv: ChTI, 1997. - 100 p. **Web resources** 1. Higher mathematics http://erudyt.net/elektronni-pidruchniki/vishha-matematika/dubovyk-yuryk-vyscha-matematyka-navch-posibnyk.html 2. Higher mathematics http://www.ex.ua/74569279

Academic staff

Name	Academic degree	Position	Qualification / Academic Discipline	Full-time / Part-time	Area of Teaching
Baliunov Oleksii Oleksandrovych	PhD in Physical and Mathematical Sciences	Associate Professor at the Department of Cybersecurity and Mathematical Modeling	Taras Shevchenko National University of Kyiv, Mechanical and Mathematical Faculty, specialty - Fluid, Gas and Plasma Mechanics, qualification - Mechanic, Applied Mathematics; PhD in Physical and Mathematical Sciences, 01.02.04 Mechanics of Deformed Rigid Body	Full-time	Higher Mathematics