

MATHEMATICAL ECONOMICS

1. Information about the course unit/module

Faculty	Mechanical Engineering and Transport				
Department	Mathematics				
Study cycle	Cycle I, Bachelor's degree, and integrated higher				
Study Programme:	0413.1 Business administration				
Year of Study	Semester	Type of assessment	Formative category	Category of optionality	ECTS Credits
1	1	E	F – Core course unit	O - Compulsory course unit	6
I	1				

2. Course unit management

Total hours in the curriculum	Hours				
	Classroom hours		Individual work		
	Course	Seminars	Year project	Study of theoretical material	Application preparation
Full-Time Study					
180	45	45	-	45	45
Part-time education					
180	18	18	-	70	74

3. Access prerequisites to the course/module

According to the curriculum	It does not exist.
According to the competencies	- Performing operations with real numbers, algebraic transformations; solving rational and irrational equations; - Performing operations with matrices, calculating determinants, solving systems of linear equations; - Identifying the function of a real variable and its main characteristics; - Knowledge of basic elementary functions, their properties, and graphs; - Calculating the derivative of a function and understanding its applications; - Calculating the indefinite integral, identifying methods for solving it; - Calculating the definite integral, understanding its properties and methods for solving it; - Identifying and applying terminology and notations related to probability theory elements in various contexts; - Interpreting and translating practical situations into mathematical language using probabilistic concepts. - Identifying and classifying events based on various criteria; - Calculating the probability of an event occurring in real and/or modeled situations.

4. Conditions for conducting the educational process for courses and seminars

Course	For presenting the theoretical material in the classroom, a blackboard and chalk are required. Optionally, a projector and computer are needed. Student lateness and phone conversations during the course will not be tolerated.
Seminars	Students will complete the assigned homework for each seminar and will come to the seminar prepared with the material from the course.

5. Specific competencies acquired

Professional competencies	- Presentation and interpretation of general and specific concepts related to economic processes. - Using basic knowledge to explain and interpret various concepts, situations, processes, etc., associated with the professional field. - Developing technical projects using the principles and methods related to the field. - Creatively applying basic knowledge in modeling and researching economic processes. - Applying various basic principles and methods to solve typical domain problems under qualified assistance. - Appropriately using knowledge to assess the quality of processes, programs, concepts, and projects.
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6. Objectives of the course unit/module

General objective	- Understanding and mastering the essential concepts of the discipline, while deepening previously acquired knowledge. - Recognizing the mathematical nature of many problems specific to economic sciences, related to the applications of vector calculus, linear programming, mathematical analysis, and mathematical statistics. - Understanding the ways in which mathematical principles can be applied in various branches of science and professional activities. - Justifying a result through reasoning based on a scientific study of the examined problem. - Mastering techniques for translating and solving mathematical problems specific to professional activities. - Identifying possible and optimal methods for solving typical problems in the field of study, using linear programming and mathematical statistics procedures.
Specific objectives	Mastering the techniques for translating and mathematically solving phenomena and processes specific to economic sciences.

7. Content of the course unit/module

Thematic content of the teaching activities	Time Allocation (hours)	
	Full-time Education	Part-time education
Course topics		
1. Elements of Advanced Algebra with Applications in Economics	6	4
2. Optimal Decision-Making through Linear Programming	6	4
3. Optimal Transportation Decisions	4	2

4. Elements of Mathematical Analysis with Applications in the Foundation of Optimal Economic Decisions	16	4
5. Elements of Probability and Mathematical Statistics	13	4
Total courses:	45	18

Seminar topics		
1. Elements of Advanced Algebra with Applications in Economics	6	4
2. Optimal Decision-Making through Linear Programming	6	4
3. Optimal Transportation Decisions	4	2
4. Elements of Mathematical Analysis with Applications in the Foundation of Optimal Economic Decisions	16	4
5. Elements of Probability and Mathematical Statistics	13	4
Total seminars:	45	18

7. Bibliographical referencee

Main	1. J. Stewart. „Calculus: Early Transcendentals”, 7th Edition, Brooks Cole, 2010. 2. Eric Lehman, F Thomson Leighton, Albert R Meyer, MIT course Mathematics for computer science. 3. Charles M. Grinstead (Swarthmore College) and J. Laurie Snell (Dartmouth College), Introduction in probability. 4. Probability theory—A first course in probability theory and statistics. Second edition De Gruyter, Berlin, [2024], 486 pp. ISBN:978-3-11-132484-5 5. Cojuhari, E.; Costaş, A.; Leah, I.; Rusu, E. Elemente de algebră liniară și geometrie analitică, (manual) Editura Tehnică, UTM, 2023. 259 p. ISBN: 978-9975-45-954-9 6. Cojuhari, E., Calcul operațional și aplicații, (manual) Editura Tehnică, UTM, 2024. 125 p. ISBN: 978-9975-64-383-2 7. Weltner, Klaus; John, S. T.; Weber, Wolfgang J.; Schuster, Peter; Grosjean, Jean. Mathematics for physicists and engineers—fundamentals and interactive study guide. Third edition. Springer, Berlin, [2023], . 656 pp. ISBN:978-3-662-66067-6
Additional	8. Virginia Atanasiu, Matematici economice: teorie și aplicații, București, Editura ASE, 2018. 9. V. Cernii. Bazele algebrei vectoriale. Ed. U.T.M., 2013. 10. N. Piscunov. Calcul diferențial și integral. Vol.1. Chișinău, Ed. Lumina, 1991. 11. M. Roșculeț. Analiză matematică, București, 1979, 1996. 12. N. Piscunov. Calcul diferențial și integral. Vol.1. Chișinău, Ed. Lumina, 1991. 13. Л. А. Кузнецов. Сборник заданий по высшей математике (Типовые расчеты). Москва, Высшая школа, 1983. 14. M. Craiu, V. Tănase . Analiză matematică, București, 1980. 15. Гмурман В.Е. Теория вероятностей и математическая статистика, Москва 1972, 1977. 16. Ion C. Șcerbațchi . Curs de analiza matematică, V1, Chișinău, 2000. 17. Ion C. Șcerbațchi. Analiză matematică (probleme), vol.1, Editura „Tehnică”, Chișinău, 1998. 18. Сборник задач по высшей математике для вузов. Под ред. Ефимова А.Б. и Демидовича Б.П., Москва: Наука, том 1, 2, 1981, 1986. 19. S. Chiriță. Probleme de matematică superioară, București, 1989.

	20. Данко П.Е., Попов А.Г., Кожевникова Т.Л. Высшая математика в задачах и упражнениях, Часть 1 и 2, Москва, 1986. 21. Сборник индивидуальных заданий по высшей математике, Под ред. Рябушко А.П., Часть 1, 2, Минск, 1990, 1991. 22. Гмуран Б.Е. Руководство к решению задач по теории вероятностей и математической статистике, Москва, 1975. 23. Руководство к решению задач по высшей математике. Под редакцией Гурского Е, Часть 1, 2, Минск, 1989, 1990. 24. Pavel Ciumas, Viorica Ciumas, Mariana Ciumas, Teoria probabilităților și elemente de statistică matematică, Editura „Tehnica” UTM, Chișinău, 2003. 25. Г.Н.Берман. Сборник задач по курсу математического анализа. Москва, Наука, 1975.
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8. Evaluation

Form of education	Periodic		Current	Individual work	Final exam
	PE1	PE 2			
Full-time education	15%	15%	15 %	15 %	40%
Part-time education	25 %			25 %	50 %
Minimum performance standard					
Attendance and activity in lectures and practical work; Achieving a minimum grade of '5' as an average for ongoing assessments and individual work; Achieving a minimum grade of '5' for each periodic assessment; Accumulating about 30% of the anticipated score in the final work.					