

SYLLABUS

INTERNATIONAL EUROPEAN
UNIVERSITY



EUROPEAN SCHOOL OF BUSINESS



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Course Name 

 Higher and applied mathematics

Lecturer (s) 

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Lecturer's profile 

 <https://business.ieu.edu.ua/kafedry/kafedra-informatsiinykh-tekhnologii#zzz-001>

Consultations

online consulting



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Discipline page 

 <https://business.ieu.edu.ua/navchannia/orhanizatsiia-osvitnoho-protsesu/robochi-prohramy/bakalavrat>

Form of final control

test

def. test

exam





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1 Brief discipline annotation

This academic discipline is basic for the development of mathematical knowledge and skills of 075 Marketing students.

2 Background for studying discipline

Subject matter of the Higher and applied mathematics discipline: matrices, determinants, systems of linear equations, vectors, operations on vectors, lines on the plane and in space, the plane, second-order curves. One of the important components of the program is interdisciplinary coordination. The Higher and applied mathematics course is designed for students who have completed high school mathematics courses. This course is basic for the study of economic disciplines.

3 Goal and objectives of the discipline

The goal of the Higher and applied mathematics discipline is to provide students with the basic ideas and methods of linear algebra, analytical geometry and mathematical analysis, the ability to apply these methods to solve specific practical problems, the amount of knowledge required for the successful study of economic disciplines and future professional activities.

Key objectives of the Higher and applied mathematics discipline:

1. To provide students with the clear understanding of matrices, determinants, vectors as basic concepts of linear algebra and analytic geometry.
2. To master the technique of calculating determinants and solving systems of linear equations.
3. To master algorithms for the scalar, mixed and vector product of vectors.
4. To use the scalar, mixed and vector product of vectors to solve practical problems.
5. To learn the technique of constructing a line with specified properties on the plane and in space.
6. To master the method of boundaries as a basic method of mathematical analysis.
7. To learn the technique of function differentiation.
8. To develop skills and abilities to solve extremum problems.
9. To master the technique of integrating functions.
10. To develop skills of applying integral calculus to solve various theoretical and practical problems.
11. To provide the necessary theoretical and practical basis for further professional activities.

4 Learning outcomes

PLO 3. To apply acquired theoretical knowledge to solve practical marketing tasks.

PLO 4. To collect and analyze necessary information, calculate economic and marketing indicators, substantiate managerial decisions based on the use of appropriate analytical and methodical tools.

5 ECTS credits

8 ECTS credits / 240 academic hours

Content sections and topics	Amount of hours											
	full-time mode of study						part-time mode of study					
	total	including					total	including				
		l	p	lab.	ind.	i. w.		l	p	lab.	ind.	i. w.
1	2	3	4	5	6	7	8	9	10	11	12	13
Content section 1. Fundamentals of linear algebra												
Matrices. Operations on matrices.	14	2	2			10	13	1				12
Determinants and their properties.	4	2	2			-	14	1	1			12
Systems of linear equations.	14	2	2			10	14	1	1			12
Methods for solving systems of linear equations.	20	2	2			16	13		1			12
Total per content section 1	52	8	8			36	54	3	3			48
Content section 2. Fundamentals of analytical geometry												
Concept of a vector. Operations on vectors. Their properties.	4	2	2			-	11	1				10
Scalar, vector and mixed product of vectors.	10	2	2			6	13	1				12
Coordinate method on the plane and in space. Different kinds of coordinate systems.	10	2	2			6	13	1				12
Straight line on the plane. Different kinds of the equation of the straight line.	4	2	2			-	13		1			12
Straight line and plane in space. Different kinds of the equation of the straight line and plane.	20	2	2			16	13		1			12
Second-order curves.	24	2	2			20	13		1			12
Total per content section 2	72	12	12			48	76	3	3			70
Content section 3. Fundamentals of mathematical analysis												
Definition of function. Classification of functions.	4	2	2			-	11	1				10
Numerical sequence. Boundary of a numerical sequence.	4	2	2			-	13		1			12
Boundary of the function at a given point. Important boundaries.	14	2	2			10	13	1				12
Continuity of the function at a point. Discontinuity points of the function.	4	2	2			-	13	1				12
Derivative of the function.	4	2	2			-	13		1			12
Complete investigation of the function.	32	6	6			20	10					10
Indefinite integral. Key integration methods.	8	4	4			-	11		1			10
Integration of different classes of functions.	28	4	4			20	13	1				12
Definite integral. Application of the definite integral.	18	4	4			10	13		1			12
Total per content section 3	116	28	28			60	110	4	4			102
Total hours	240	48	48			144	240	10	10			220



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List of obligatory tasks

1. Matrices. Operations on matrices.
2. Determinants and their properties.
3. Systems of linear equations.
4. Methods for solving systems of linear equations.
5. Concept of a vector. Operations on vectors. Their properties.
6. Scalar, vector and mixed product of vectors.
7. Coordinate method on the plane and in space. Different kinds of coordinate systems.
8. Straight line on the plane. Different kinds of the equation of the straight line.
9. Straight line and plane in space. Different kinds of the equation of the straight line and plane.
10. Second-order curves.
11. Definition of function. Classification of functions.
12. Numerical sequence. Boundary of a numerical sequence.
13. Boundary of the function at a given point. Important boundaries.
14. Continuity of the function at a point. Discontinuity points of the function.
15. Derivative of the function.
16. Complete investigation of the function.
17. Indefinite integral. Key integration methods.
18. Integration of different classes of functions.
19. Definite integral. Application of the definite integral.

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List of selective tasks

1. Determinants and their properties.
2. Methods for solving systems of linear equations.
3. Scalar, vector and mixed product of vectors.
4. Straight line on the plane. Different kinds of the equation of the straight line.
5. Straight line and plane in space. Different kinds of the equation of the straight line and plane.
6. Second-order curves.
7. Boundary of the function at a given point. Important boundaries.
8. Complete investigation of the function.
9. Integration of different classes of functions.
10. Definite integral. Application of the definite integral.

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Discipline features

Period of teaching	Semester	International disciplinary integration	Year of study	Courses: general training/ professional training/elective
2 semesters	1st, 2nd semesters	available	1st year (second) or second accelerated year	Professional training



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10 Assessment system and requirements. General system of discipline assessment

As part of discipline teaching, one carries out current and final control of students' knowledge. The final credit grade is given according to the total rating of students.

According to the results of current control during a semester, students can obtain 100 points maximally, the minimum sum of points allowing students to pass the discipline is 60 points.

Correlation between national and ECTS grades and student rating: <https://ieu.edu.ua/docs/pol-mark-esb.pdf>

11 Admission to final control

The minimum amount of points that should be obtained by students for current educational activities during a semester to be admitted to the final control is 36 points. The grade for the discipline is defined as a sum of the final points for current activities and the points for the final control and is expressed due to the multipoint scale. The grade for the discipline completing with the exam is determined as the sum of points for current learning activities (at least 36), points for individual independent work of students (no more than 6) and points for the exam (at least 24). The overall points of the discipline are 100. The total grade for the discipline is given according to the national and European scale. <https://ieu.edu.ua/docs/050.pdf>

12 Discipline policy

To ensure fruitful learning and cognitive activities of students while studying the discipline, one holds relevant lectures and seminars in the form of presentations, case studies, group work and discussion seminars. The study of the discipline includes teamwork and individual group work. The classroom atmosphere is friendly, polite and creative. Students should be honest and responsible. It is important to remember that attendance at lectures and practical classes is a prerequisite for the assessment of knowledge. The teaching staff should constantly advance their professional level, teaching skills, general culture, as well as provide students with appropriate conditions for learning educational programs according to the requirements for the content, level and capacity of education, and encourage their comprehensive development, develop young people's respect for parents, women, older people, colleagues, and classmates.

13 Policy of absence and late task performance

Students who miss the current control for valid reasons confirmed by documents have the right to take current control within two weeks after returning to studying.

Students who have missed classes without valid reasons, have not participated in current control activities, have not liquidated academic failure are not admitted to the final semester control of this discipline. In this case, an academic staff member puts a mark 'non-admission' in the exam record.

Repeated taking of the exam in the discipline is appointed in case of accomplishing all types of educational, independent (individual) work stipulated by the working program of the academic discipline and is carried out according to the approved schedule of academic failure liquidation.

<https://ieu.edu.ua/docs/050.pdf>



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14 Academic integrity policy

Participants in the educational process rely on the academic integrity principles
<https://ieu.edu.ua/docs/011.pdf>

15 Recommended sources of information

Primary literature:

1. Valieiev K.H., Jaladova I.A., Liutyi O.I. et al. Higher mathematics: Study guide for self-study of disciplines. – K.: KNEU, 2002. – 606 p.
2. Higher mathematics: Textbook / Dombrovskiy V.A., Kryzhanivskiy I.M., Matskiv R.S., Myhovych F.M., Nemish V.M., Okrepkyi B.S., Khoma H.P., Shelestovska M.Y.; edited by Shynkaryk M.I. – Ternopil: Karpiv Publishing House, 2003. – 480 p. – ISBN 966-7946-15-0.
3. Oleksenko V.M. Distance course of linear algebra and analytical geometry: study guide. – Kh.: NTU "KhPI", 2003. – 240 p.
4. Oleksenko V. M. Linear algebra and analytical geometry: textbook. – Kharkiv: NTU "KhPI", 2006. – 372 p.
5. Collection of calculation and graphic tasks in higher mathematics in 2 parts / Edited by Chikina N.O. – Part 1. – Kh.: Textbook of NTU "KhPI", 2012. – 224 p.
6. Collection of calculation and graphic tasks in higher mathematics in 2 parts / Edited by Chikina N.O. – Part 2. – Kh.: Textbook of NTU "KhPI", 2013. – 216 p.
7. Vasylenko I. P. Higher mathematics for economists: Textbook. – 3rd ed. revised and supplemented. – K.: Znannia, 2007. – 454 p.
8. Zavalo S.T. Algebra course. – K.: Higher School, 1985. – 503 p.
9. Zavalo S.T., Kostarchuk V.N., Hatzet B.I. Algebra and number theory: In 2 parts. – K.: Higher school, 1974. – Part 1. – 464 p.
10. Bilousova V.P., Iliin I.H., Serhunova O.P., Kotlova V.M. Analytical geometry. – K.: Vyshcha Shkola, 1973. – 328 p.
11. Shkil M.I., Kolesnyk T.V., Kotlova V.M. Higher mathematics. Book 1. – K.: Lybid, 2010. – 592 p.
12. Shkil M.I., Kolesnyk T.V., Higher mathematics. Book 2. – K.: Lybid, 2010. – 496 p.
13. Shkil M.I., Kolesnyk T.V., Higher mathematics. Book 3. – K.: Lybid, 1994. – 351 p.

Additional literature:

1. Higher mathematics using information technologies: Textbook / V.P. Ivashchenko, H.H. Shvachych, V.S. Konovalenkov, T.M. Zaborova, V.I. Khrystian. – Dnipro, 2013. – 425 p.
2. Higher mathematics with elements of information technology: Study guide. – K.: IAPM, 2002. – 408 p.
3. Diuzhenkova L.I., Diuzhenkova O.Y., Mykhalin H.O. Higher Mathematics. Examples and tasks: Study guide. – K.: Academy, 2002. – 624 p.
4. Hryhorov A.V., Didkovska B.V., Navrotskyi V.O. Elements of linear algebra and analytical geometry. – Workshop for managers using Mathcad capabilities: Study guide. – Kyiv: Delta, 2006. – 512 p.

16 Tips on successful study during the course

If you want to succeed in this discipline, you should:

- define your goal
- draw up a precise schedule
- work hard
- be confident and conscious
- be creative and active.

Thus, I wish you insistence, goal commitment and optimism. And you'll definitely succeed! See you at classes!