ENGLISH – SYLLABUS (GENERAL)

SUBJECT:

ELEMENTS OF MATHEMATICS

Studies: Management I cycle studies Management Specialty: ALL			**Faculty: Management**		
Subject status	**Type of studies**	**Semester/ Term**	**Teaching hours**		**ECTS Points**
			lectures	**classes**	
	Full time studies	1	26	20	**7**

Course description:

The study programme on Elements of Mathematics is designed to equip students with a comprehensive understanding of the foundational principles that underpin the entire field of mathematics. From basic arithmetic to advanced abstract algebra, the curriculum is structured to build a strong mathematical foundation while emphasizing critical thinking and problem-solving skills. The interdisciplinary nature of the program ensures that students recognize the broad applications of mathematics in various fields.

The coursework covers a spectrum of topics, ranging from classical mathematical structures to contemporary developments, providing a holistic view of the subject. Through a combination of theoretical lectures and practical applications, students will develop the ability to think logically, analyse problems, and communicate mathematical concepts effectively.

The program encourages active engagement with mathematical theories, fostering an environment that nurtures intellectual curiosity and independent research. Students will not only gain proficiency in applying mathematical concepts but also understand the historical context and evolution of these principles.

The course is filled in with many case studies and practical examples of Elements of mathematic problems, so it should be interesting for all those students who are eager to deal with sales management issues also after the course.

COURSE LEARNING OBJECTIVES:

1. Foundational Understanding: Develop a strong foundational understanding of fundamental mathematical concepts, theories, and structures.
2.Critical Thinking Skills: Foster critical thinking skills through the application of mathematical reasoning and problem-solving techniques.
3. Interdisciplinary Applications: Explore the interdisciplinary applications of mathematical principles in various fields such as physics, computer science, economics, and engineering.
4. Communication Proficiency: Enhance communication skills in the context of mathematical concepts, ensuring the ability to articulate complex ideas effectively.
5. Advanced Topics Exploration: Provide opportunities for students to delve into advanced topics within the realm of mathematics, fostering a deeper appreciation for the subject.

Teaching the functions and role of Elements of mathematics for contemporary market entities, developing skills in solving Elements of mathematics problems, as well as analysing data (from primary and secondary data).

Creating presentations for the reports and written reports on Elements of mathematics problems. Training of social competences related to collective problem solving and preparing and introducing all stages of Elements of mathematics in contemporary world.

COURSE EVALUATION:

Workshops – desk research report (written and oral), classes participation and activities, case studies

Lectures - final exam will be one-choice questions and open questions. (or TBA during classes)

The grading scale is as follows:

100% - 85%	5.0 (excellent)
84,9% - 75%	4.5 (very good)
74,9% - 70%	4.0 (good)
69,9% - 60%	3.5 (very satisfactory)
50% - 59,9%	3.0 (satisfactory)
< 50%	2.0 (failure)

Course policies and class rules:

The use of smartphones, mobile phones, all devices with internet access, are not allowed during the exams. During other in-class assignments you can use them for assignment purposes only. Students are expected to take full responsibility for their academic work and academic progress. Students are expected to attend class regularly, for consistent attendance offers the most effective opportunity open to all students to gain a developing command of the concepts and materials of the course. The study programme is strict about student attendance regulations. Students who focus on the business of the class increase their likelihood of success. They can do so by listening attentively to the instructor or to other students while participating in discussions. During class, they can participate as fully as possible and volunteer to answer questions. Students should minimise all behaviours that distract others during the class. Talking to other students apart from class discussions is inappropriate. Students who arrive late should seat themselves as quietly and as near to the door as they can. Students who must leave before the class period ends should exit quietly. The course material is designed to be completed within the semester time frame.

Finally, please feel free to come and see me to ask questions or to discuss difficult material. The course material is all cumulative. If you do not understand what happens in the first week, you will not understand what happens in the last week.

Teaching Methods:

Lectures and case studies (multimedia, case study – projects on sales management topics)

Course overview:

The study programme on Elements of Mathematics is designed to equip students with a comprehensive understanding of the foundational principles that underpin the entire field of mathematics. From basic arithmetic to advanced abstract algebra, the curriculum is structured to build a strong mathematical foundation while emphasizing critical thinking and problem-solving skills. The interdisciplinary nature of the program ensures that students recognize the broad applications of mathematics in various fields. The coursework covers a spectrum of topics, ranging from classical mathematical structures to contemporary developments, providing a holistic view of the subject. Through a combination of theoretical lectures and practical applications, students will develop the ability to think logically, analyse problems, and communicate mathematical concepts effectively.

The program encourages active engagement with mathematical theories, fostering an environment that nurtures intellectual curiosity and independent research. Students will not only gain proficiency in applying mathematical concepts but also understand the historical context and evolution of these principles.

Main topics:

1. Number Theory and its Applications
2. Linear Algebra and Matrix Theory

3. Calculus: From Basics to Multivariable
4. Set Theory and Logic
5. Probability and Statistics
6. Geometry: Euclidean and Non-Euclidean
7. Abstract Algebra: Groups, Rings, and Fields
8. Differential Equations and Dynamical Systems

Literature

Main texts:

1. Stewart, James "Calculus: Early Transcendentals" - Cengage Learning -2018
2. Axler, Sheldon "Linear Algebra Done Right" -Springer -2015
3. Tao, Terence - "Analysis I" - Hindustan Book Agency - 2016
4. Gallian, Joseph A. "Contemporary Abstract Algebra" - Cengage Learning - 2018
5.Ross, Sheldon M. "A First Course in Probability" - Pearson - 2019

Additional required reading material:

1. Rudin, Walter "Principles of Mathematical Analysis" McGraw-Hill Education - 2016
2. Axler, Sheldon "Measure, Integration & Real Analysis" - Springer - 2015
3. Strang, Gilbert "Introduction to Linear Algebra" - Wellesley-Cambridge Press - 2016

Rules of the exams on subject (Assessments)

Lectures – Written exam (test and case study)
Classes – case study, discussion, attendance, activities, project, essay

Date of submitting the syllabus: 30.09.2023

Accepted by: Dean of International Affairs

Signature: .....

KATOWICE BUSINESS UNIVERSITY
Harcerzy Września 1939 nr 3
40-659 Katowice, Poland
tel. +48 32 35 70 603/643
www.akademiagornoslaska.pl (197