Course title:	Mathematics	ECTS	4
English translation of the course title:	Mathematics		
Degree program name:	Food Science Technology and Nutrition		

Course language: English			Stage: I	
Form of studies: ☒ intramural ☐ extramural	Type of module: ☒ basic ☐ directional	☒ mandatory ☐ elective	Semester:	☒ winter semester ☐ summer semester
Academic year:	2022/2023	Catalogue number:	**FSTN_1_Z_02**	

Course coordinator :	**Dr hab. Elżbieta Wójcik-Gront, prof. SGGW**
Teachers responsible for the course:	**Employees of the Department of Biometry, Institute of Agriculture , WULS**
Objectives and description of the course:	The aim of the course is to familiarize students with the basic concepts and methods of higher mathematics to the extent necessary for an abstract understanding of problems in the field of natural, technical and agricultural sciences; presentation of the theoretical foundations of mathematical analysis and linear algebra as well as practicing the ability to solve accounting problems in this area; presenting examples of simple applications of mathematics in physics, chemistry and food sciences. Description of the classes: Lecture: Reminder of actions on powers. Logarithms, exponential and logarithmic equations. Numeric sets. Extended set of real numbers. Matrices, determinants, systems of linear equations. Application of matrix calculus in dietetics. General properties of functions. Overview of elementary functions. Strings, sequence boundary. Numerical series, criteria of series convergence. Limit and derivative of functions of one variable. Basic derivative interpretations. Application of the derivative in chemical kinematics. Examination of functions with derivatives. Finding the smallest and the largest value of the function. Indefinite integral and methods of integration. Definite integral and its geometric and physical applications. Improper integral. Ordinary differential equations. Examples of application of differential equations: kinetics of microbiological processes, cooling of bodies, process of sugar inversion. Tutorials: Operations with powers and logarithms. Solving exponential and logarithmic equations. Performing operations on matrices, solving systems of linear equations. Balancing with the use of systems of equations of ingredients in the diet. Examination of general properties of functions. Studying properties of sequences and calculating their limits. Convergence of series. Calculating limits of functions of one variable, examining the continuity of a function. Calculation of derivatives of functions of one variable. Determining the tangent equation to the graph of a function. Calculation using the derivative of the rate of a chemical reaction. Study of the course of function variability. Finding a function with the use of the derivative of the smallest and the largest value. Calculation of indefinite and definite integrals. Calculation by means of definite integrals of the mean value of the function, mean velocity, mean specific heat. Calculating the areas of plane figures.
Teaching forms, number of hours :	a) lecture; number of hours 15; b) laboratory classes; number of hours 30;
Teaching methods:	lecture, discussion, problem solving
Formal prerequisites and initial requirements:	mathematical knowledge in the field of elementary mathematics at the level of elementary school, middle school and high school in the general profile

Learning outcomes:		The content of the effect assigned to the course:	Relation to the course outcomes	*Impact on the course outcomes* *
Knowledge: (The graduate knows and understands)	W1	The student knows and understands the basic definitions, properties, criteria and theorems concerning elementary functions, sequence limit, number series as well as function limit and continuity. The student knows and understands the basic definitions, properties, theorems and interpretations of differential and integral calculus. The student knows and understands the basic definitions, properties and theorems concerning matrices, determinants and systems of linear equations.	FSTN1_K_W01	1
Skills: (The graduate is able to)	U1	The student is able to study the properties of simple elementary functions, calculate the limits of simple sequences, investigate the convergence of simple series, calculate the limits and study the continuity of simple functions. The student is able to calculate the derivatives of simple functions, study their properties with the help of derivatives, calculate simple indefinite, marked and incorrect integrals, calculate the areas and mean values of functions with the help of integrals. The student is able to perform arithmetic operations on matrices, calculate determinants and orders of matrices and solve systems of linear equations in simple cases.	FSTN1_K_U01	1
Competences: (The graduate is ready to)	K1	The student is ready to use the models and accounting techniques learned in the course in simple practical problems related to major subjects.	FSTN1_K_K01	1

Program contents ensuring the achievement of the learning outcomes:	Matrices, numerical sets, general properties of functions, sequences, numerical series, limit and derivative of functions of one variable, indefinite integral, definite and improper integral, ordinary differential equations.

Methods of the verification of the learning outcomes:	W1, U1, K1 - Lecture test and / or exercise test and / or activity
Details on the verification methods and of the ways of documenting the learning outcomes:	Paper or electronic personal colloquium and final test cards (from the lecture test)
Elements and weights influencing the final grade:	Exercise tests - 50%, lecture tests - 40%, activity - 10%
Teaching place:	Lecture halls and training rooms of the Warsaw University of Life Sciences

Literature:

1. Krysicki W., Włodarski L. ,,Analiza matematyczna w zadaniach cz. 1, 2" PWN Warszawa 2004.
2. Gilbey J., Pemberton S. ,,Cambridge International AS & A Level Mathematics: Pure Mathematics 1 Coursebook" Cambridge University Press 2018
3. Linsky J.; Western B. ,, Complete Pure Mathematics 1 for Cambridge International AS & A Level" Oxford University Press 2018
4. Jewell R., Goldie S., A Level Mathematics: First Aid Kit" Taylor & Francis Group 2020.
5. Skrakowski J., Smith H. (red.) "Pearson Edexcel International A Level Mathematics Further Pure Mathematics 1 Student Book" wydawnictwo Pearson 2018.

ANNOTATIONS

*) 3 – Significant and detailed, 2 – Partial, 1 – Basic,

Quantitative summary of the course:

Estimated number of work hours per student (contact and self-study) essential to achieve the presumed learning outcomes of the module - base for quantifying ECTS:	65.25 h
Total ECTS points accumulated by the student during contact learning:	5.8 ECTS