SYLLABUS

Course description

Course code	Course	**MATEMATYKA**		
MB/O/I/NST/A.1		**MATHEMATICS**		
Language of instruction	English			
Academic year	2023/2024			
field of study:	Mechanical Engineering			
field of specialisation:	all			
Educational level	first-cycle studies			
Education profile	General academic			
Mode of study	Part-time studies			
Semester(s)	1, 2			
Affiliation with a group of classes	Basic classes			
Course status	obligatory			
Types of classes, instruction hours, ECTS credits	Types of classes	Number of instruction hours	Number of ECTS credits	
	Lecture	15[h]/15[h]	Sem.1: 6 ECTS Sem.2: 6 ECTS	
	Classes	30[h]/30[h]		
Linkage of the course	with the education profile	Related to the conducted scientific activity in the discipline to which the field of study is assigned	0 ECTS	
	with qualifications	It is used to acquire engineering competences by the student	12 ECTS	
	with science discipline	Mechanical engineering	12 ECTS	
Form of teaching	Traditional – classes organized at the University /classes conducted using online learning methods and techniques			
Prerequisites	Knowledge of basic issues and methods in the field of algebra and mathas analysis at secondary school level			
Department	UTH Radom			
Coordinator	Dr inż. Monika Maj			
The website of the basic organizational unit	www.uniwersytetradom.pl			
E-mail address, phone number of the coordinator	m.maj@uthrad.pl, tel. 48 3617817			

LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES

Learning Objective:	Lecture: gaining knowledge and skills in the field of differential calculus and total function of one variable, linear algebra, analytic geometry, differential calculus functions of two variables, solving basic types of differential equations Exercises: using the learned mathematical apparatus to solve problems occurring in directional issues, use of Matlab to present the content of lectures.
Curriculum Content:	Lectures: 1. Mathematical Logic. Elements of set algebra and arithmetic 2. Functions and their properties 3. Strings and numerical series 4. Function limit and continuity 5. Differential calculus of a function of one variable: derivative and its geometric interpretation, derivative and differences of higher orders, formulaLeibniz, Rolle and Lagrange theorems, conclusions from the Lagrange theorem, Taylor and Maclaurin patterns, extreme function, conciseness and convexity of the graph of functions, inflection points, del'Hospital theorem, asymptotes of the graph of functions, and the study of the course of variability function 6. Integral calculus of a function of one variable: the primary function, basic integration methods, integration of measurable functions, non-measurable, trigonometric and cyclometric, integer Riemann, its geometric interpretation, properties and applications, integers incorrect and their convergence criteria 7. Complex numbers 8. Matrices and determinants 9. Systems of linear equations 10. Differential calculus of functions of many variables: boundary and continuity, partial derivatives, total difference, extreme of many functions variables, extremes conditional 11. Ordinary differential equationns 12. Completion of the lecture Lectures: W1, W2, K2 Exercises: 1. Elements of logic and algebra of sets 2. Function Property Examination, Function Submitting, Function Assignment inverse, drawing and transforming graphs functions 3. Determining the boundaries of the numerical strings 4. Boundary determination and 6h function continuity test 5. Calculation of derivatives. Determination of extremes and ranges monotony of functions. Determination of bending points and intervals the convexity and concavity of the graph of functions. 6. Using de l'Hospital's theorem to define boundaries. Calculation of asymptotes. Use of derivatives to test functions, study of the course of the variability of functions. Application of derivatives to solving text problems with geometric and physical content. Optimization 7. Basic rules and methods of integration. Basic methods integration for an unspecified integer, integration of selected function classes. Calculation of marked integers. Application of geometric integers marked. Calculation of wrong integers. 8. Performing actions on complex numbers, drawing sets on Gaussian planes, solving equations 9. Actions on matrices, determination of inverse matrix, calculation matrix determinant, determination of matrix order 10. Solving systems of linear equations (tw. Cramera, tw. Kronecker Capelli, Gaussian elimination method) 11. Calculation of scalar, vector and mixed product of vectors,

	determination of the plane and straight in space. 12. Limit and Continuity of Functions of Multiple Variables, Determination of Derivatives partial and directional functions of many variables, local extremes. 13. Solving ordinary differential equations 14. Colloquium Exercises: W1, W2, U1, U2, K1, K2
Didactic (educational) methods:	Lecture: - traditional method supported by multimedia techniques; - elements of a conversational lecture Exercises: - accounting exercises; - diactic discussion; - group work.
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	The condition for passing the exercises is attendance at the classes (allowed missing two classes per semester) and achieving the required results education specified for the subject. The final grade of the exercises is the sum of assessments (points) from two colloquiums in the semester. In addition, students can earn extra points for activity in classes (relation 1plus=0. 5 points) possibly points for engagement for promotional and teaching activities Faculty (related to course content) . Assessment of the lecture on the basis of written credit in the first semester and written exam in the second semester. Obtaining positive grades from all forms of classes included inof a given subject is equivalent to its completion and achievement by the number of ECTS credits allocated to the subject.

Learning outcomes for the course in relation to the field of study learning outcomes and the type of classes				Methods of verifying learning outcomes	
Learning outcome number	Description of the learning outcomes for the course (PEU) A student who has passed the course (**W**) knows and understands / (**U**) can / (**K**) is ready to:	Field of study learning outcome (KEU)	Types of classes	Form of verification (credits)	Methods of testing and assessment
W1	Knows and understands the basic issues of analysis mathematics, and in particular arithmetic differential and total useful for modelling and analysis of mechanical systems	K_WG01	Lecture, exercises	Exam Colloquium Activity at classes	Written exam Credit with assessment
W2	Knows and understands the basic issues of algebra, and in particular linear algebra, analytical geometry, elements of logic.	K_WG01	Lecture, exercises	Exam Colloquium Activity at classes	Written exam Credit with assessment
U1	Can use the rules of logic mathematical applications Mathematical and technical.	K_UW01	Lecture, exercises	Exam Colloquium Activity at classes	Written exam Credit with assessment
U2	Can use known methods and mathematical models for basic analysis, physical and technical issues, is able to use a matrix account.	K_UW01	Lecture, exercises	Exam Colloquium Activity at classes	Written exam Credit with assessment
K1	He's willing to lead a small team of people. taking responsibility for the results of work of the team and its individual participants.	K_UO20	Lecture, exercises	Exam Colloquium Activity at classes	observation

K2	Is ready for continuous improvement of qualifications professional and knows the possibilities of lifting them.	K_UU21	Lecture, exercises	Exam Colloquium Activity at classes	observation

Literature and teaching aids
Basic: 1. Edwards C.H., Jr. David E. Penney “Calculus and analytic geometry”, Prentice-Hall, Inc., 1986; 2. Lial M., Miller C. Finite Mathematics and Calculus with application.- Scott, Foresman and Company. 1989; 3. John E. Hutchinson ”Introduction To Mathematical Analysis”, Department of Mathematics School of Mathematical Sciences ANU, 1994; 4. Walter Rudin, “Principles of Mathematical Analysis”, McGraw-Hill, 1976; Additional: 1. James Stewart, Calculus: Early Transcendentals (6th international metric edition), Brooks/Cole 2008, (selected sections);

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits			
Attendance, participation	Student workload [h].		
	Other contact hours (IGK)	Student’s self-study hours Classes without a teacher (ZBN)	Classes
Participation in lectures	X	X	30 [h]
Participation in classes	X	X	60[h]
Meeting with teachers during their duty hours	10[h]	X	X
Preparation for lectures/classes/.... , Preparation for ... credit / exam	X	85[h]/90[h 25[h]]	X
Total student workload	10 [h]/ 0,4 ECTS	200[h]/8ECTS	90[h]/ 3,6 ECTS
ECTS credits for the course	300 [h] / 12 ECTS		

Additional information, comments
In the case of students with special needs, including disabilities, and chronic illnesses, the methods and forms of verification of learning outcomes specified above (in the syllabus) are adapted to the individual needs of these students, as appropriate. Detailed rules and forms of support for students with special needs, including those with disabilities and chronically ill, during classes, credits, and exams are specified in: University Regulations (Regulamin Studiów Uniwersytetu Technologiczno-Humanistycznego w Radomiu), Study Regulations (Zasady Studiowania), and Procedure for Ensuring Accessibility of the Educational Process to Students with Special Needs, Including Those with Disabilities and Chronically ill (Procedura dotycząca zapewnienia dostępności procesu kształcenia studentom ze szczególnymi potrzebami, w tym: z niepełnosprawnością, przewlekle chorych).