

## DESCRIPTION OF THE COURSE OF STUDY

<b>Course code</b>	0531-2CHEM-C01-M	
<b>Name of the course in</b>	Polish	Matematyka
	English	Mathematics

## 1. LOCATION OF THE COURSE OF STUDY WITHIN THE SYSTEM OF STUDIES

<b>1.1. Field of study</b>	Chemistry
<b>1.2. Mode of study</b>	Full-time studies
<b>1.3. Level of study</b>	First-cycle studies
<b>1.4. Profile of study*</b>	General academic
<b>1.5. Person/s preparing the course description</b>	Dr. hab. Pawel Rodziewicz, Assoc. Prof.
<b>1.6. Contact</b>	pawel.rodziewicz@ujk.edu.pl

## 2. GENERAL CHARACTERISTICS OF THE COURSE OF STUDY

<b>2.1. Language of instruction</b>	English
<b>2.2. Prerequisites*</b>	Completed course in mathematics – high-school certificate

## 3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

<b>3.1. Form of classes</b>	Lectures, exercises	
<b>3.2. Place of classes</b>	Classes in the teaching room of the UJK	
<b>3.3. Form of assessment</b>	Lecture - exam, seminar- credit with grade	
<b>3.4. Teaching methods</b>	Lecture, discussion	
<b>3.5. Bibliography</b>	<b>Required reading</b>	„The Chemistry Maths Book” Erich Steiner, Oxford University Press, Second Edition 2008
	<b>Further reading</b>	“Mathematical Analysis I” V. A. Zorich, Springer Verlag, Second Edition, 2016 “Mathematical Analysis II” V. A. Zorich, Springer Verlag, Second Edition, 2016

## 4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

<p><b>4.1. Course objectives (including form of classes)</b></p> <p><b>LECTURE</b> <i>The aim of the lecture is to present the basic issues related to mathematics needed for chemists.</i></p> <p><b>SEMINAR</b> <i>The aim of the seminar is to solve tasks and problems related to the content introduced during the lecture.</i></p>
<p><b>4.2. Detailed syllabus (including form of classes)</b></p> <p>Lecture:</p> <p>Limit and derivative of a function. Maximum and minimum of a function. Function series. Taylor and Maclaurin series. Complex numbers. Euler's formula. Power, exponential, logarithmic, polynomial, trigonometric functions. Indefinite and definite integrals. Ordinary differential equations (ODE) and basic partial differential equations (PDE). Vectors. Scalar (dot) and vector (cross) product. Matrices. Eigenvector and eigenvalue. System of linear equations. Fourier series and Fourier transform.</p> <p>Seminar:</p> <p>Function curve sketching (tracing). Maximum and minimum of a function. Calculation of derivatives from its definition and equations. Operations with complex numbers. Sketching power, exponential, logarithmic, polynomial, trigonometric functions. Calculation of integrals utilizing integration by substitution (reverse chain rule or change of variables) and integration by parts (partial integration). Solving ordinary differential equations (ODE) and basic partial differential equations (PDE) used in chemistry. Graphical and algebraic representation of vectors. Calculation of scalar (dot) and vector (cross) product. Operations with matrices. Calculation of matrix determinant, inverse matrix, matrix eigenvalues. Solving of system of linear equations.</p>

#### 4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of <b>KNOWLEDGE:</b>		
W01	Student knows properties of basics functions and sketch their curves	CHEMIA_W02
W02	Student knows the methods of calculation of derivatives and integrals	CHEMIA_W02
within the scope of <b>ABILITIES:</b>		
U01	Student can solve systems of linear equations utilizing matrices	CHEMIA_U03
U02	Student can sketch function curve	CHEMIA_U03
U03	Student can solve simple integrals and differential equations	CHEMIA_U03
within the scope of <b>SOCIAL COMPETENCE:</b>		
K01	Student is aware of the importance of mathematics and is aware of the need to constantly acquire knowledge and skills related to the work of a chemist	CHEMIA_K01

#### 4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes (code)	Method of assessment (+/-)								
	Exam (written)			Test			Effort in class*		
	Form of classes			Form of classes			Form of classes		
	L	E	...	L	E	...	L	E	...
W01	+								
W02	+								
U01	+				+				
U02	+				+				
U03	+				+				
K01								+	

#### 4.5. Criteria of assessment of the intended learning outcomes

Form of classes	Grade	Criterion of assessment
Lecture (L) (including e-learning)	3	Written exam, 50-60% points
	3,5	Written exam, 61-70% points
	4	Written exam, 71-80% points
	4,5	Written exam, 81-90% points
	5	Written exam, 91-100% points
classes (C)* (including e-learning)	3	Credit with grade - test, 50-60% points
	3,5	Credit with grade - test, 61-70% points
	4	Credit with grade - test, 71-80% points
	4,5	Credit with grade - test, 81-90% points
	5	Credit with grade - test, 91-100% points
others (...)* (including e-learning)	3	Credit with grade - test, 50-60% correct answers
	3,5	Credit with grade - test, 61-70% correct answers
	4	Credit with grade - test, 71-80% correct answers
	4,5	Credit with grade - test, 81-90% correct answers
	5	Credit with grade - test, 91-100% correct answers

**5. BALANCE OF ECTS CREDITS – STUDENT’S WORK INPUT**

Category	Student's workload	
	Full-time studies	Extramural studies
<i>NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/</i>	<b>90</b>	
<i>Participation in lectures</i>	30	
<i>Participation in seminars</i>	60	
<i>INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/</i>	<b>110</b>	
<i>Preparation for the lecture</i>	10	
<i>Preparation for the seminars</i>	55	
<i>Preparation for the exam</i>	45	
<b>TOTAL NUMBER OF HOURS</b>	<b>200</b>	
ECTS credits for the course of study	<b>8</b>	

**Accepted for execution** (date and legible signatures of the teachers running the course in the given academic year)

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