Mathematics

Educational subject description sheet

Basic information

Study programme Chemia (General Chemistry) **Speciality** - **Organizational unit** Faculty of Chemistry **Study level** First-cycle programme **Study form** Full-time **Education profile** General academic	**Didactic cycle** 2023/24 **Subject code** 02CENS.13K.01812.23 **Lecture languages** English **Course type** Obligatory **Block** Major subjects

Subject coordinator	William Mance
Lecturer	William Mance

Period	Activities and hours	Number of ECTS points
Semester 1	• Lecture: 15, Exam; including sub-activities: ◦ Synchronous lecture: 15 • Classes: 30, Graded credit	4

Period	Activities and hours	Number of ECTS points
Semester 2	• Lecture: 15, Exam • Classes: 30, Graded credit	4

Goals

Code	Goal
C1	Prepare students to further study chemistry.
C2	Familiarize students with antiderivatives and the Riemann integral.
C3	Familiarize students with tools from linear algebra.
C4	Familiarize students with calculus in multiple dimensions.
C5	Familiarize students with differential equations.

Entry requirements

No prerequisites required.

Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
Knowledge – Student:			
W1	knows the Fundamental Theorem of Calculus.	CEN_K1_W03	Written exam, Written colloquium
W2	will learn to use Gaussian elimination to solve linear systems of equations.	CEN_K1_W03	Written exam, Written colloquium
W3	will learn how to find extrema of functions of two variables.	CEN_K1_W03	Written exam, Written colloquium
W4	will learn to solve some basic differential equations.	CEN_K1_W03	Written exam, Written colloquium
Skills – Student:			
U1	knows how to calculate antiderivative of an elementary function or by integrating by substitutions or by parts.	CEN_K1_U08	Written exam, Written colloquium
U2	is able to use several methods of computing determinants.	CEN_K1_U08	Written exam, Written colloquium
U3	is able to solve linear differential equations.	CEN_K1_U08	Written exam, Written colloquium
Social competences – Student:			
K1	is ready to study selected fragments of mathematics used in some chemical models.	CEN_K1_K06	Written exam, Written colloquium

Study content

No.	Course content	Subject learning outcomes	Activities
1.	Antiderivatives and Riemann Integration.	W1, U1, K1	Lecture, Classes, Synchronous lecture

No.	Course content	Subject learning outcomes	Activities
2.	Linear algebra.	W2, U2, K1	Lecture, Classes, Synchronous lecture
3.	Funcitons of multiple variables.	W3, K1	Lecture, Classes, Synchronous lecture
4.	Partial derivatives and extrema.	W2, U3, K1	Lecture, Classes, Synchronous lecture
5.	Differential equations.	W4, U3, K1	Lecture, Classes, Synchronous lecture

Additional information

Semester 1

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues, Conversation lecture
Classes	Classes method

Activities	Credit conditions
Lecture	The condition for taking the exam (written form) is to obtain passing grades in exercises. Grading scale with applied percentage distribution: • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%. • good (4.0): achievement of student learning outcomes 70.0% - 79.9%. • average (3.5): achievement of student learning outcomes 60.0% - 69.9%. • satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.
Classes	Written colloquium. Grading scale with applied percentage distribution: • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%. • good (4.0): achievement of student learning outcomes 70.0% - 79.9%. • average (3.5): achievement of student learning outcomes 60.0% - 69.9%. • satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.

Semester 2

Activities	Teaching and learning methods and activities
Lecture	Lecture with a multimedia presentation of selected issues
Classes	Classes method

Activities	Credit conditions
Lecture	The condition for taking the exam (written form) is to obtain passing grades in exercises. Grading scale with applied percentage distribution: • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%. • good (4.0): achievement of student learning outcomes 70.0% - 79.9%. • average (3.5): achievement of student learning outcomes 60.0% - 69.9%. • satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.
Classes	Written colloquium. Grading scale with applied percentage distribution: • excellent (5.0): achievement of the student's expected learning outcomes at a minimum of 90.0%. • very good (4.5): achievement by the student of the desired learning outcomes ranging from 80.0% - 89.9%. • good (4.0): achievement of student learning outcomes 70.0% - 79.9%. • average (3.5): achievement of student learning outcomes 60.0% - 69.9%. • satisfactory (3.0): attainment of the student learning outcomes within 50.0% - 59.9%. • unsatisfactory (2.0): failure of the student to achieve the expected learning outcomes below 50.0%.

Literature

Obligatory

1. Calculus: Early Transcendentals 8th Edition by James Stewart

Optional

1. Calculus: Early Transcendentals 8th Edition by James Stewart

Calculation of ECTS points

Semester 1

Activities	Activity hours*
Lecture	15
Classes	30
Preparation for the assessment	50
Preparation for the exam	25
Student workload	**Hours** 120
Number of ECTS points	**ECTS** 4

* academic hour = 45 minutes

Semester 2

Activities	Activity hours*
Lecture	15
Classes	30
Preparation for the assessment	25
Preparation for classes	25
Preparation for the exam	25
Student workload	**Hours** 120
Number of ECTS points	**ECTS** 4

* academic hour = 45 minutes

Efekty uczenia się dla kierunku

Kod	Treść
CEN_K1_K06	The graduate is ready to formulate precise questions to deepen his/her own understanding of a topic or to find missing pieces of reasoning
CEN_K1_U08	The graduate can apply mathematical methods in chemical and physicochemical calculations
CEN_K1_W03	The graduate knows and understands techniques of higher mathematics for the formal description of basic physical and chemical processes