



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mathematics [N1TCh2>MAT1]

Course

Field of study

Chemical Technology

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

20

Laboratory classes

0

Other

0

Tutorials

20

Projects/seminars

0

Number of credit points

6,00

Coordinators

dr Alina Gleska

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Lecturers

Prerequisites

1. Student has knowledge of mathematics within the scope of teaching at secondary level 2. Student has the ability to think logically, associate facts, analyse issues and make appropriate inferences 3. Student is aware of the need to know mathematics while studying various subjects in the field of chemical technology

Course objective

none

Course-related learning outcomes

none

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written exam during the session

Tutorials - one colloquium + activity in class

Percentage thresholds have been adopted in both forms of classes:

below 50% grade 2.0 50%-59% grade 3.0 60%-69% grade 3.5
70%-79% grade 4.0 80%-89% grade 4.5 90%-100% grade 5.0

Programme content

Complex numbers - algebraic form (modulus, conjugate number, arithmetic, second degree roots), trigonometric form (de Moivre's formula for potentiation, theorem on the root of complex numbers). Definition of a number sequence. Monotonicity, limit, convergence of sequences. The unambiguity theorem of the limit. Arithmetic of finite limits and improper limits. The theorem of three sequences. Definition of Euler's constant. Numerous examples.

Definition of functions. Concepts of domain and counter-domain of functions. The differentiable function and the "on" function. Monotonicity of functions. Even and odd functions. Periodicity of functions. Complex functions. Function inverse.

Review of elementary functions - polynomial, power, exponential, logarithmic, trigonometric functions. Introduction of cyclometric functions - formulas, graphs, properties.

The limit of a function at a proper point. Arithmetic of finite limits. One-sided limits. Inappropriate limits. Determination of asymptotes of the graph of a function. Continuity of a function.

Definition of the derivative of a function at a point. Geometric interpretation. The equation of the tangent and the equation of the normal. Rules of differentiation (paying special attention to the derivative of a complex function).

Mean value theorems and their application to the study of monotonicity of functions. Necessary condition for the existence of a local extremum of a differentiable function. Sufficient condition for the existence of a local extremum of a differentiable function.

Derivatives of higher orders. Convex and concave curves (also the concepts: upward convex, downward convex). Points of inflection.

Indeterminate expressions. De l'Hospital's theorem.

An elementary function, an indeterminate integral. Integrals of elementary functions. Theorems on integration by parts and integration by substitution. Integration of measurable functions. Integration of trigonometric functions (universal substitution).

Introduction of the concept of the definite integral. Theorem on the relationship of the definite and indefinite integral of a continuous function. Formulas for integration by parts and by substitution for the definite integral. Interpretation geometric interpretation of the definite integral. Application of the definite integral to the calculation of areas of planar regions. Application of the definite integral to the calculation of the lengths of curves. Application of the definite integral to the calculation of volumes of solids of revolution. Application of the definite integral to the calculation of areas of solids of revolution.

Course topics

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convex). Points of inflection.

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Teaching methods

Lecture - multimedia presentation + examples of calculation on the blackboard

Tutorials - solving tasks on the blackboard, including discussion of the solution obtained and interpretation of results

Bibliography

1. W. Żakowski, Matematyka, T.1 i T.2, WNT, Warszawa 2003.
2. M. Gewert, Z. Skoczylas, Analiza matematyczna 1 (Definicje, twierdzenia, wzory), GiS, Wrocław 2011.
3. M. Gewert, Z. Skoczylas, Analiza matematyczna 1 (Przykłady i zadania), GiS, Wrocław 2011.
4. T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna 1, (Definicje, twierdzenia, wzory), GiS, Wrocław 2007.
5. T. Jurlewicz, Z. Skoczylas, Algebra i geometria analityczna 1, (Przykłady i zadania), GiS, Wrocław 2007.

Breakdown of average student's workload

| | Hours | ECTS |
|---|-------|------|
| Total workload | | |
| Classes requiring direct contact with the teacher | | |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | | |