UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

of Mathematics and Computer Sciences

Course/module syllabus - part A

ANALIZA MATEMATYCZNA 1

11120-10-B
ECTS: 7
YEAR: 2015Z

COURSE CONTENT
CLASSES

Solving problems related to the content of lectures.

LECTURES

Axiomatic and construction of the real numbers. Basic theorems on the complex numbers. Sequences and series. The Bolzano-Cauchy th.The limit function at a point.One-sided limits.Types of the function discontinuity at the point.The improper limits.The Weierstrass th. of the function boundedness on a closed interval.Uniform continuity.The Cantor th.Infinitely small,infinitely large values.The definition of the derivative of the function at a point,geometrical interpretation,applications.Theorem on linear function approximation .One-sided derivatives.Infinite derivatives.Continuity of differentiable function.Derivatives of higher orders.Leibniz formula.The Fermat th.on local extremum,the Rolle th.,the Lagrange th.on finite increments,the Cauchy th.,the de l'Hospital th.Necessary and sufficient conditions of existence of local extremes of the function.Global extremes.Convex and concave functions.Flex points.Asymptotes.The Taylor th.on polynomials.Taylor formula,applcation to the calculation of function limit at a point.

EDUCATIONAL OBJECTIVE:

To familiarize students with differential calculus of functions of one variable.

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN RELATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	X1A_K01++, X1A_K03++, X1A_K04++, X1A_U01+++, X1A_U02+++, X1A_U06++, X1A_U07+, X1A_W01+, X1A_W02+, X1A_W03+++,
Codes of learning outcomes in a major area of study:	K1_K01++, K1_K02+, K1_K04+++, K1_U01+++, K1_U09++, K1_U10++, K1_U11++, K1_W03++, K1_W04+, K1_W05+, K1_W07+,

LEARNING OUTCOMES:
Knowledge

W1 - The student has a basic knowledge of: the differential and integral calculus of multivariable functions, applications of the main notions and concepts of the calculus to study the function, theory of numerical and functional sequences, theory of differential equations.

Skills

U1 - The student is able to formulate and verify problems for functions of one variable.
U2 - The student can explore the properties of functions of one variable using the appropriate mathematical methods.

Social competence

K1 - The student knows the limits of his own knowledge and understands the need for further education.
K2 - Student is able to precisely formulate questions to deepen their understanding of the issues relating to mathematical analysis.
K3 - The student is aware of the need to respect the principles of the code of ethics.

BASIC LITERATURE

SUPPLEMENTARY LITERATURE

Course/module:
Analiza matematyczna 1

Fields of education:
Obszar nauk ścisłych

Course status:	mandatory
Course group:	B - major course
ECTS code:	11120-10-B
Field of study:	Mathematics
Specialty area:	Mathematics
Educational profile:	General academic
Form of study:	full-time
Level of study:	first degree studies
Year/semester:	1 / 1

Type of course:
Classes, Lecture

Number of hours per semester/week: Classes: 45, Lecture: 45

Teaching forms and methods

Classes(K1, K2, K3, U1, U2, W1) : Illustration of the content of the lectures by problems (U1, U2, U3, U4, , Lecture(K1, K2, K3, U1, U2, W1) : Traditional lecture. The lecture informative and problem. Giving theorems proofs or sketches. Discussion of the examples and counterexaples. Multimedia illustration of some of the content.

Form and terms of the verification results:

CLASSES: Written test - null(null) ; CLASSES: Evaluation of the work and cooperation in the group - Taking into account the active role of the student in solving problems (K1, K2, K3, U1, U2, W1) ; CLASSES: Colloquium test - Written test - verification of skills and competencies developed during solving problems.(K1, K2, K3, U2, W1) ; LECTURE: Oral exam - Audit question on the test carried out during the written examination in the event of doubt as to the assessment.(K1, K2, K3, U1, U2, W1) ; LECTURE: Written exam - Multiple-choice test, yes/ no questions test - the test contains closed- ended questions and various types of open- ended questions. It verifies both the knowledge acquired during lectures and personal skills and competencies.(K1, K2, K3, U1, U2, W1)

Number of ECTS points: 7

Language of instruction:

Introductory courses:
non

Preliminary requirements:
Basic knowledge from previous education.

Name of the organizational unit offering the course:
Katedra Analizy i Równań Różniczkowych,

Person in charge of the course:
dr hab. Artur Siemaszko, prof. UWM

Course coordinators:

Notes:

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The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: classes	45 h.
- participation in: lecture	45 h.
- consultation	5 h.
	95 h.

2. Student's independent work:

- the assimilation of the content given during the lecture from notes and literature. solving exercises and problems with textbooks.	87 h.
	87 h.

1 ECTS point = 25-30 h of the average student's work, number of ECTS points = 182 h : 26 h/ECTS = 7,00 ECTS
on average: **7 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher: 3,65 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work: 3,35 ECTS points,