Course Syllabus

I. General Information

Course name	Introduction to differential and integral calculus
Programme	Informatics
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BA
Form of studies (full-time, part-time)	full-time
Discipline	Mathematics
Language of instruction	English

Course coordinator	dr Andrzej Michalski

Type of class *(use only the types mentioned below)*	Number of teaching hours	Semester	ECTS Points
lecture	30	I	5
tutorial			
classes			
laboratory classes	30	I	
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	Ability to perform calculations on real numbers. Knowledge of basic formulas and functions. Ability to search for information in the literature.

II. Course Objectives

To present mathematical and supporting IT tools necessary for further study.
To present the basic concepts and theorems of calculus.
To develop skills in applied calculus.

III. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE: Student knows and understands		
W_01	Basic notions and properties related to set theory (K_W02).	K_W02
W_02	Basic concepts and definitions of calculus (K_W02).	K_W02
W_03	Basic methods and theorems of calculus (K_W02).	K_W02
W_04	Selected applications of calculus (K_W05).	K_W05
SKILLS: Student has ability to		
U_01	Solve typical problem using standard methods and supporting IT tools (K_U03, K_U21).	K_U03, K_U21
U_02	Analyze complex problem, propose and explain the optimal methods for its solution (K_U21, K_U22).	K_U21, K_U22
U_03	Solve selected practical problems (K_U21, K_U22).	K_U21, K_U22
SOCIAL COMPETENCIES: Student is able to		
K_01	Formulate opinions on the applicability of calculus methods taking into account their knowledge and skills (K_K01).	K_K01

IV. Course Content

Basics of set theory. Relations. Functions. Sequences and series. Convergence.
Limit and continuity of a function of one real variable. Derivative and its interpretation. Higher order derivatives. Applications of the derivatives.
Antiderivative and indefinite integral. Definite integral and its interpretation. Fundamental theorem of calculus (Newton – Leibniz theorem). Applications of the integrals. Selected topics in ordinary differential equations.
Limit and continuity of a function of several real variables. Partial derivatives. Differentiability. Applications of differential calculus of several variables.
Basics of vector calculus.
Multiple integrals.

V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods *(choose from the list)*	Forms of assessment *(choose from the list)*	Documentation type *(choose from the list)*
KNOWLEDGE			
W_01	conventional lecture, discussion, practical classes	test, written exam, oral exam	evaluated test, protocol
W_02	conventional lecture, discussion, practical classes	test, written exam, oral exam	evaluated test, protocol
W_03	conventional lecture, discussion, practical classes	test, written exam, oral exam	evaluated test, protocol
W_04	conventional lecture, discussion, practical	test, written exam, oral exam	evaluated test, protocol

	classes		
		SKILLS	
U_01	conventional lecture, discussion, practical classes, laboratory classes	test, written exam, oral exam	evaluated test, protocol
U_02	conventional lecture, discussion, practical classes, laboratory classes	test, written exam, oral exam	evaluated test, protocol
U_03	conventional lecture, discussion, practical classes, laboratory classes	test, written exam, oral exam	evaluated test, protocol
		SOCIAL COMPETENCIES	
K_01	conventional lecture, discussion, practical classes, laboratory classes	test, written exam, oral exam	evaluated test, protocol

VI. Grading criteria, weighting factors.....

LECTURE:

The completion of classes is required. Written and oral exam together constitute the final grade:

91 – 100% excellent

81 – 90% very good

71 – 80% good

61 – 70% satisfactory

51 – 60% sufficient

less than 51% fail

CLASSES:

At least 80% of attendance is required. Two tests together constitute the final grade:

91 – 100% excellent

81 – 90% very good

71 – 80% good

61 – 70% satisfactory

51 – 60% sufficient

less than 51% fail

Detailed assessment rules are given during lectures and classes.

VII. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	Lecture: 30 hrs. Classes: 30 hrs. Individual consultations: 30 hrs. In total: 90 hrs.
Number of hours of individual student work	Preparation for classes: 30 hrs. Studying books: 30 hrs. Preparation for tests and exams: 30 hrs. In total: 90 hrs.

VIII. Literature

Basic literature
Lecture notes. Worksheets.
Additional literature
In English: J. Stewart, Single Variable Calculus, Cengage Learning, 2007. R. Ellis, D. Gulick, Calculus: One and Several Variables, Harcourt Brace Jovanovich, 1991. D. D. Berkey, P. Blanchard, Calculus, Saunders College Pub., 1992. S. L. Salas, E. Hille, J. T. Anderson, Calculus: One and Several Variables with Analytic Geometry, Wiley, 1986. In Polish: M. Gewert, Z. Skoczylas, Analiza Matematyczna 1, Oficyna Wydawnicza GiS, 2005. M. Gewert, Z. Skoczylas, Analiza Matematyczna 2, Oficyna Wydawnicza GiS, 2005. W. Krysicki, L. Włodarski, Analiza matematyczna w zadaniach, PWN, 2004. M. Gewert, Z. Skoczylas, Równania różniczkowe zwyczajne, Oficyna Wydawnicza GiS, 2006. T. Krasiński, Analiza matematyczna. Funkcje jednej zmiennej, Wyd. UŁ, Łódź 2003. F. Leja, Rachunek różniczkowy i całkowy ze wstępem do równań różniczkowych, PWN, Warszawa 1977. G. Fichtenholz, Rachunek różniczkowy i całkowy, PWN, 2005.