

SYLLABUS

SUBJECT Calculus 2 - Semester 4

TEACHER Prof. dr hab. Andrzej KAMIŃSKI

COURSE DESCRIPTION

The course is the second part of Calculus 2 (continuation of the first part of Calculus 2 from Semester 3 and of Calculus 1 from Semesters 1 and 2). The aim of the course is to provide for the students a knowledge of the theory and applications of the differential and integral calculus for functions of several variables (the second part) and of elements of the theory of differential equations. The students are expected to understand mathematical notions as well as to use them in practice, i.e. to master techniques of calculations.

The program of the course contains the following: Short repetition of the first part of Calculus 2 (see Syllabus of Calculus 2 – Semester 1). Definite integrals over plane and solid regions (double, triple and multiple integrals). Change of variables, the Jacobian. Line and surface integrals. Green's theorem, the divergence theorem, Stokes' theorem. Differential forms, simplexes and chains, the generalized Stokes theorem. Closed and exact forms. Elements of the theory of ordinary differential equations: initial and boundary conditions, a general and particular solution; differential equations with separable variables; first and second order differential equations; the methods of undetermined coefficients and variation of parameters; homogeneous and non-homogeneous linear differential equations; characteristic equations; linear independence of functions, Wrońskians.

LEARNING OUTCOMES

The examination at the end of the semester will consist of two parts, written and oral exams.

GRADING POLICY

To pass the written exam it is necessary for a student to get more than 50 % of the total possible points. Students who fail the written part still have chance to pass the examination during the oral part. The oral exam is obligatory for all who get not more than 60 % of the total possible points in the written part. Students who get more than 60 % of the total possible points during the written part are released from the oral exam unless they want to improve their grades from the written exam. The grades will be given according to the following rule:

the amount of the received points

in the limits 75.1 % - 100 %	of the total possible points	corresponds to the grade	5 (A)
70.1 % - 75.0 %		corresponds to	4.5 (B)
65.1 % - 70.0 %		corresponds to	4 (C)
60.1 % - 65.0 %		corresponds to	3.5 (D)
50.1 % - 60.0 %		corresponds to	3 (E)
0 % - 50.0 %		corresponds to	2 (F)

TIMETABLE

The two-hour lectures will be given on a fixed day every week. The exact time and place will be given later.

TEXTBOOK AND REQUIRED MATERIALS

The main textbook:

[*] Walter Rudin, *Principles of Mathematical Analysis*, McGraw-Hill Book Company, New York,

the 1953, 1964, 1976 or further editions (ISBN 0-07-054235-X).

Additional(optional) bibliography:

[1] J. Dieudonné,

Foundations of Modern Analysis, Academic Press, New York, 1960.

[2] W. H. Fleming,

Functions of Several Variables, Addison-Wesley Publishing Company, Reading, the 1965 or further editions.

[3] W. Rudin,

Real and Complex Analysis, McGraw-Hill Book Company, New York, the 1974 or further editions.

[4] R. Sikorski

Advanced Calculus. Functions of Several Variables, PWN, Warszawa, the 1969 or further editions.

[5] M. Spivak

Calculus on Manifolds, W. A. Benjamin, New York, the 1965 or further editions.

[6] Morris Tenenbaum, Harry Pollard,

Ordinary Differential Equations. An Elementary Textbook for Students of Mathematics, Engineering, and the Sciences, Dover Publications, Inc., New York, the 1985 or further editions (ISBN 0-486-64940-7).

PREREQUISITES:

The knowledge of the material of Calculus 1 (see Syllabi of Calculus 1 – Semesters 1 and 2) and the first part of Calculus 2 (see Syllabus of Calculus 2 – Semester 3) as well as the knowledge get from all other earlier and parallel courses.