

Title: Mathematics 3

Lecturer: Prof. Dr. Gregor Dolinar

Aim of the course:

Students broaden the understanding of the basic concepts of mathematical analysis, procedures and rules. They apply the knowledge of these concepts to technical problems. They develop analytical thinking skills and critical reasoning.

Required (pre)knowledge:

Mathematics 1, Mathematics 2

Contents:

Differential geometry: space curves (parametrization, tangent vector, length), surfaces (parametrization, coordinate curve, normal vector).

Multiple integrals: integrals with parameters, double and triple integrals.

Vector analysis: directional derivative, gradient, divergence, curl, nabla operator.

Line and surface integrals: Green's theorem, Gauss's theorem, Stokes's theorem.

Complex analysis: analytic functions, elementary complex functions, integral of a complex function, Cauchy's integral formula, Laurent series, residue theorem, conformal maps.

Selected references:

E. Kreyszig: Advanced engineering mathematics, John Wiley & Sons, 2006

G. B. Thomas: Thomas' Calculus, Pearson Education, 2005