

Differential and integral calculus 2, MS-A0211

Course web-page

<https://mycourses.aalto.fi/course/view.php?id=22024>

Learning outcomes

After the course the student will

- know how to calculate approximations with the aid of partial derivatives
- be able to solve systems of equations with Newton's method
- know and understand the basic ideas of optimization
- be able to use Lagrange multipliers
- be able to calculate double and triple integrals
- be able to change the order of integration in double integrals
- know how to change variables in double and triple integrals

Content

Functions of several variables and their derivatives, optimization of functions with several variables, double and triple integrals.

Course book

Calculus, A Complete Course, Adams och Essex, 8th Edition

Examination

You can get a grade for the course in two ways.

- One possibility is to write the course exam, solve hand in exercises, and present solutions during the exercise session during the course.
 - **Each week** you have **two exercise sessions**, one on **Monday** or **Tuesday (exercise session 1)** and one on **Thursday (exercise session 2)**. (The first week **exercise session 1** is cancelled.)
 - Before **exercise session 1** you will get 6 exercises. 3 of these you work with during the session (the solutions are presented on the board by the assistant) and 3 you hand in for correction (deadline for handing in on **Wednesdays** (4 points for each correct solution)).
 - Before **exercise session 2** you will get 3 exercises (available on **Tuesdays**) to which you or someone of your fellow students presents solutions to at the board. (4 points for each correct solution)

- The points you collect during the course represent 40% of your grade. The rest of the depends on your score on the course exam on 09.04.19 13.00 - 16.00
- The other possibility is to take the exam on 09.04.19 13.00 - 16.00 or exams at later dates. The score on the exam determines your grade.

Teachers

- My name is Björn Ivarsson and I am the lecturer on the course. My office is Y326 and you can come there with any question you have about the course. You can also send me an e-mail (bjorn.ivarsson@aalto.fi). Exercise sessions are taken care of by Cintia Pacchiano and Emil af Björkesten.

Lecture plan

- Lecture 1: Curves and arc length (Ch 8.2, 8.4, 11.1)
- Lecture 2: Functions of several variables, limits, continuity (Ch 12.1 - 2)
- Lecture 3: Partial derivatives (Ch 12.3 - 4)
- Lecture 4: Chain rule, Linear approximation and differentiability (Ch 12.5 - 6)
- Lecture 5: Gradient, directional derivative, implicit functions, Taylor approximation (Ch 12.6 - 9)
- Lecture 6: Optimization with or without constraints, Lagrange multipliers (Ch 13.1 - 3)
- Lecture 7: Lagrange multipliers, Method of least squares, Newton's method (Ch 13.3, 13.5, 13.7)
- Lecture 8: Double integrals, iterated integrals, generalised double integrals (Ch 14.1 - 3)
- Lecture 9: Polar coordinates, tripple integrals, change of variables (Ch 14.4 - 6)
- Lecture 10: Applications of multiple integrals (Ch 14.7)
- Lecture 11: Reserve
- Lecture 12: Reserve