

# Complex Analysis, MS-C1300, Period II, Autumn 2023

## Webpage of the Course

<https://mycourses.aalto.fi/course/view.php?id=40902>

## Learning Outcomes

After passing the course the student will

- be able to make use of complex numbers in solving geometric problems
- be able to solve mapping problems in the plane
- recognize behavior of complex functions
- be able to interpret basic properties of analytic functions
- be able calculate real integrals by making use of complex integrals

## Content

The interpretation and use of complex numbers, analytic function, conformality, harmonic functions, basic complex functions, line integrals, sequences and series, Cauchy formula and its consequences.

## Course Book

- *An Introduction to Complex Function Theory*, Bruce Palka, Undergraduate Texts in Mathematics, Springer, 1991

An alternative that is excellent but a little more challenging:

- *Complex Analysis*, Lars Ahlfors, McGraw-Hill, 1979

## Teaching

All lectures will be given on campus. The lecture are on Mondays 12 - 14 and Thursdays 10 - 12. There is also three exercise groups that meet two times a week. The schedule for the exercise groups can be found on the course web page. Recordings of the lectures from previous years will be available on the course web page.

## Examination

There will be a course exam on December 4th 09:00 - 12:00

During the course there will be hand-in exercises to solve. Group H01 meets on Tuesdays and Thursdays. Group H02 and Group H03 meet on Wednesdays and Fridays. Before each meeting (but not the first group meeting) you will get 2 exercises to solve that you hand in for grading. Deadlines will be Mondays (for the Tuesday/Wednesday meetings) and Wednesdays (for the Thursday/Friday meetings) at 23:59. The assistants will present solutions to these problems (and other problems) during the following group session. The points you collect in this way will give you bonus points on the course exam (6 bonus points is the maximum). When you take the course exam these bonus points will be added to your result (maximum 24 points).

## Lecturer and Assistants

My name is Björn Ivarsson and I am the lecturer for the course. My office is Y326 and you are welcome there with any question concerning the course that you might have. You can also e-mail me ([bjorn.ivarsson@aalto.fi](mailto:bjorn.ivarsson@aalto.fi)). The assistants are David Adame-Carrillo, Jaime Pardo, and Matilde Costa. They will be running the group meetings.

## Tentative Plan for Lectures

- Lecture 1, The Complex Number System (Chapter 1 in the book)
- Lecture 2, Rudiments of Plane Topology (Chapter 2)
- Lectures 3 - 4, Analytic Functions (Chapter 3)
- Lecture 5, Complex Integration (Chapter 4)
- Lectures 6 - 8, Cauchy's Theorem and its Consequences (Chapter 5)
- Lectures 9 - 10, Sequences and Series of Analytic Functions (Chapter 7)
- Lectures 11 - 12, Isolated Singularities of Analytic Functions (Chapter 8)