

MATH 3007A - Functions of a Complex Variable

Fall 2021

Instructor Dr. S. Melkonian (4279 HP, 520-2600 ext. 2126)

E-mail melkonia@math.carleton.ca

Office Hours Online or in person, by appointment

Textbook Lecture notes on Brightspace

Lectures In person, Tuesday and Thursday 11:40 AM – 12:50 PM
Additionally, recorded lectures will be posted on Brightspace

Tutorials In person, Thursday 10:40 AM – 11:20 AM, beginning September 23

Tests There will be four tests online, 10:30 AM – 11:30 AM, on the dates given below
Do not go to the tutorial room, find a quiet location to write the tests

Test 1: Thursday, September 30

Test 2: Thursday, October 14

Test 3: Thursday, November 4

Test 4: Thursday, November 25

Marking Scheme

The best three out of the four tests will count for 45% and the final examination for 55% of the final grade

Topics

Complex numbers
Polar representation of complex numbers
Euler's identity
The effect of multiplication
De Moivre's formula
Roots of complex numbers
The complex exponential function
The complex trigonometric functions
The argument of a complex number
The complex logarithm
Complex exponents of complex numbers
Limits and continuity

The extended complex plane
Limits at infinity and infinite limits
Open sets and neighbourhoods
The complex derivative and analytic functions
The Cauchy-Riemann equations
The derivative of the logarithm
Connected sets
Alternative form of the Cauchy-Riemann equations
Harmonic functions
Curves in the complex plane
Line integrals
Arclength
The fundamental theorem for line integrals
Path independence of integrals
The path independence theorem
Homotopy
Simply-connected sets
The deformation theorem
Cauchy's theorem – homotopy version
Cauchy's theorem – for a simply-connected domain
The antiderivative theorem
The generalized deformation theorem
Winding number
Cauchy's integral formula
Cauchy's integral formula for derivatives
Series representations of analytic functions
Taylor series
Laurent series
Singularities
Poles
Zeros
Residues
The residue theorem
Evaluation of definite integrals
Evaluation of infinite series
Conformal mappings

Academic Accommodation

Pregnancy or religious obligation

Contact me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>.

Academic accommodations for students with disabilities

If you have a documented disability requiring academic accommodations in this course, please

contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. PMC website: <https://carleton.ca/pmc>.

COVID-19 Protocol

All members of the Carleton community are required to follow COVID-19 prevention measures and all mandatory public health requirements (e.g. wearing a mask, physical distancing, hand hygiene, respiratory and cough etiquette) and [mandatory self-screening](#) prior to coming to campus daily.

If you feel ill or exhibit COVID-19 symptoms while on campus or in class, please leave campus immediately, self-isolate, and complete the [mandatory symptom reporting tool](#). For purposes of contact tracing, attendance will be taken in all classes and labs. Participants can check in using posted QR codes through the cuScreen platform where provided. Students who do not have a smartphone will be required to complete a paper process as indicated on the [COVID-19 website](#).

All members of the Carleton community are required to follow guidelines regarding safe movement and seating on campus (e.g. directional arrows, designated entrances and exits, designated seats that maintain physical distancing). In order to avoid congestion, allow all previous occupants to fully vacate a classroom before entering. No food or drinks are permitted in any classrooms or labs.

For the most recent information about Carleton's COVID-19 response and required measures, please see the University's [COVID-19 webpage](#) and review the [Frequently Asked Questions \(FAQs\)](#). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca.

Please note that failure to comply with University policies and mandatory public health requirements, and endangering the safety of others are considered misconduct under the Student Rights and Responsibilities Policy. Failure to comply with Carleton's COVID-19 procedures may lead to supplementary action involving Campus Safety and/or Student Affairs.

Last modified: September 8, 2021, 1:00 PM.