

APPLMATH 3811A - Course Outline - FW 2023-24

1. Course Information

Applied Mathematics 3811A, Complex Variables with Applications, FW 2023-24

Times and Location: M/W/F 09:30-10:20, UCC-61 (In-Person Delivery)

List of Prerequisites

Calculus 2303B or Calculus 2503B

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructor: Anibal Medina-Mardones, Ph.D.
Email: anibal.medina.mardones@uwo.ca
Office: MC 112
Phone: Ext 88875
Office Hours: Mon 15:30–16:30 or by appointment

Students must use their Western (@uwo.ca or @ivey.uwo.ca) email addresses when contacting me.

Please use “APPLMATH 3811A” (exactly as typed) in the subject line of your email.

Please know that I will not use email to explain mathematical concepts.

Office hours will be held in person in my office.

3. Course Content

This is a first course in Complex Analysis. Complex analysis is an essential prerequisite for much of mathematics, engineering, and other scientific disciplines. It is also a beautiful subject, where the calculations are elegant, and yields results of stunning beauty and power. Our focus is on giving enough coverage to reach some of the prime applications, especially the application to computing inverse Laplace and Fourier Transforms.

Official Description

Functions of a complex variable, analytic functions, integration in the complex plane, Taylor and Laurent series, analytic continuation, Cauchy's theorem, evaluation of integrals using residue theory, applications to Laplace transforms, conformal mapping and its applications.

Course Learning Outcomes

- Carry out basic arithmetic using complex numbers, and elementary functions of complex numbers (complex functions).
- Explain what it means for a complex function to be continuous, differentiable (analytic), and integrable. Demonstrate the continuity, differentiability, and integrability of a complex function in a variety of ways.
- Calculate limits, derivatives, and (contour) integrals of elementary complex functions, and compositions thereof in a variety of ways.
- Analyze the behaviour of sequences of complex functions, explain the relationship between such behaviour and the analyticity of a complex function, and explain the implications of such behaviour for complex integration.
- Apply your knowledge of complex functions to solve problems typically associated with the calculus of functions of a single real variable.
- Construct written mathematical arguments in a clear, concise, and grammatically correct manner.

Book

Fundamentals of Complex Analysis: with Applications to Engineering and Science by Edward Saff and Arthur Snider, 3rd Edition. Available as e-book & paperback.

4. Key Sessional Dates

Classes begin:	September 7, 2023
Last day to add:	September 15, 2023
No classes:	September 29, 2023
Holiday:	October 9, 2023
Reading Week:	October 30 to November 5, 2023
Last day to drop:	November 13, 2023
Classes end:	December 8, 2023
Exam period:	December 10 to 22, 2023

5. Evaluation Method

The final course grade will be determined by student performance on

Assignments:	25%	Submitted every two weeks.
Participation:	10%	Based on student's engagement during class.
Midterm Test:	25%	Scheduled during class on October 20 (50 min).
Final Exam:	40%	Scheduled by the Office of the Registrar (120 min).

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Assessments Worth At Least 10% of Course Grade

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the [University's medical illness policy \(click here\)](#) and review the [Student Medical Certificate \(click here\)](#). In the event that the links do not work, type either

- https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf (for policy)
- https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf (for certificate)

into your browser.

Absences From Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., 3 or more exams in 23-hour period, 4 or more exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under Special Examinations).

Final Make-up Date

To be determined by the Office of the Registrar.

7. Learning Management System (OWL)

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Help desk. They can be contacted by phone at 519-661-3800 or ext. 83800.

8. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least

two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult [the University's list of recognized religious holidays \(click here\)](#), which is updated annually. Alternatively, you may wish to enter

- <https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

directly into your browser.

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. Students can consult [the policy on Academic Accommodation for Students with Disabilities \(click here\)](#). Alternatively, type

- [www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf)

into a browser.

9. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca> ([click here](#)).

In accordance with [policy \(click here\)](#), the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner. The policy referenced above can also be accessed by typing

- https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf

into your browser.

Scholastic offences are taken seriously and students are directed to read the appropriate [policy \(click here\)](#), specifically, the definition of what constitutes a Scholastic Offence. This policy can also be accessed by typing

- http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

into your browser.

In the event of a health lock-down, tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide personal information (including some biometric data) and the session will be recorded. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at <https://remoteproctoring.uwo.ca> ([click here](#)).

10. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/> (click here).

Students who are in emotional/mental distress should refer to Mental Health@Western by visiting their website <https://uwo.ca/health/> (click here) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will information about support services for survivors, including emergency contacts [is available \(click here\)](#). If you cannot access the link you can type

- https://www.uwo.ca/health/student_support/survivor_support/get-help.html

into your browser. To connect with a case manager or set up an appointment, please email support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact [Accessible Education \(click here\)](#) if you have any questions regarding accommodations. If the link provided does not work, type

- http://academicsupport.uwo.ca/accessible_education/index.html

into your browser.

Learning-skills counsellors at the [Student Development Centre \(click here\)](#) are ready to help you improve your learning skills (alternatively, type <https://learning.uwo.ca> into your browser). They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/> (click here).