

MATH 3124A/ 9024A Course Outline

1. Course Information

Course Information:

Math 3124A/9024A: Complex Analysis I, September – December 2023

Section 001: In-person lectures, MWF 9:30 – 10:20am Middlesex College, Room 17

List of Prerequisites: Mathematics 2122A/B or equivalent.

Unless you have either the requisites for this course or written special permission from your dean 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

Instructors	Email	Office	Office Hours
Blake Boudreaux	bboudre7@uwo.ca	MC 121	Mon 11 – 12pm, Thurs 2:30 – 3:30pm

Office hours, two per week, will be held in room 121 of Middlesex College. You may also contact the instructor to make an appointment outside of regularly scheduled office hours.

3. Course Syllabus, Schedule, Delivery Mode

Lectures: Lectures are conducted in-person MWF 9:30 – 10:20am Middlesex College, Room 17.

Course description: The Cauchy-Riemann equations, elementary functions, branches of the logarithm and argument, Cauchy's integral theorem and formula, winding number, Liouville's theorem and the fundamental theorem of algebra, the identity theorem, the maximum modulus theorem, Taylor and Laurent expansions, isolated singularities, the residue theorem and applications, the argument principle and applications.

Learning outcomes: All students are, by the end of this course, expected to:

- Be able to demonstrate knowledge of the fundamental definitions and derivations in the course, through their application in standard situations.
- 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.
- 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.

Key Sessional Dates:

Classes begin: September 7, 2023

National Day for Truth and Reconciliation (observed at Western): September 29, 2023

Thanksgiving: October 9, 2023

Fall Reading Week: October 30 – November 5, 2023

Classes end: December 8, 2023

Exam period: December 10 – 22, 2023

Contingency plan

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

4. Course Materials

Required Textbook: *Complex Analysis (Third Edition)* by J. Bak and D. Newman. This book is available online at the university library.

Technical Requirements

Computer or laptop access and a stable internet connection

Paper, pencils, erasers

(Recommended) access to a printer

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assignments (9) 40%

Midterm Test 25%

Final Exam 35%

Assessment Schedule (subject to change):

Week 1 (Sept 7 – 8)	
Week 2 (Sept 11 – 15)	
Week 3 (Sept 18 – 22)	Assignment 1 due Friday, September 22

Week 4 (Sept 25 – 29)	No Assignment due (in observance of National Day for Truth and Reconciliation)
Week 5 (Oct 2 – 6)	Assignment 2 due Friday, October 6
Week 6 (Oct 9 – 13)	Assignment 3 due Friday, October 13
Week 7 (Oct 16 – 20)	Midterm on Friday, October 20, 7-9pm (no assignment due)
Week 8 (Oct 23 – 27)	Assignment 4 due Friday, October 27
Fall Reading Week: Oct 30 – Nov 3	
Week 9 (Nov 6 – 10)	Assignment 5 due Friday, November 10
Week 10 (Nov 13 – 17)	Assignment 6 due Friday, November 17
Week 11 (Nov 20 – 24)	Assignment 7 due Friday, November 24
Week 12 (Nov 27 – Dec 1)	Assignment 8 due Friday, December 1
Week 13 (Dec 4 – 8)	Assignment 9 due Friday, December 8

Assignments: The assignments are equally-weighted and consist of about one question for every thirty minutes of class time. They should be submitted on Friday before the lecture begins. Graduate students enrolled in Math 9024A will be given one or two additional, more challenging problems each assignment.

Problems must be completed neatly and contain thorough explanations. You are expected to convey your ideas in a clear and concise way without leaving gaps for the reader to fill. Answers without explanations will receive no marks, and full credit will not be awarded for work that is messy, vague, or incomplete. Collaboration with other students with other students when working on assignments is encouraged, but solutions submitted must be written in the student's own words and reflect the student's own understanding of the problem. Plagiarism is a serious scholastic offence carrying serious consequences.

In addition to the assignments, it is highly advised to frequently complete additional problems appearing in the course notes and textbook. Doing so will give you the practice needed to succeed in the course. You should expect some exam problems to be based on problems encountered in the course materials and examples worked out during class.

Midterm: The midterm will cover material from weeks 1–6 inclusive (as labelled above). Graduate Students enrolled in Math 9024A will receive a modified version of the exam with somewhat more challenging problems. A student who obtains an academic consideration to miss a midterm test from their faculty counselling office will be given the opportunity to write a makeup within one week. If an

academic consideration is obtained for the makeup as well, the student's final exam grade will account for 55% of the course grade.

Final Exam: The final exam is cumulative and three hours long. Graduate students enrolled in Math 9024A will receive a modified version of the exam with somewhat more challenging problems. It will be scheduled by the university during the final exam period **December 10 – 22, 2023**. You should not make travel arrangements until you know the timing of all your exams.

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 less than 10% of the overall course grade:

The instructor is empowered (but not obliged) to grant academic considerations for the assignments in this course. Considerations may take the form of assignment extensions or, in exceptional circumstances, the omission of an assignment. Note that in all cases where documentation (medical or otherwise) is required, it can only be collected by the student's Dean's Office Academic Counselling unit.

Assessments worth 10% or more of the overall 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 at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf.

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

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., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

6. 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 University's list of recognized religious holidays (updated annually) at

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

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. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

7. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

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

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.

Calculators and other aids are not permitted during final exams, midterm tests, and in-class quizzes.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

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

In the event that in-person examinations become prohibited (e.g. 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>.

8. 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/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) 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 find information about support services for survivors, including emergency contacts at

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

To connect with a case manager or set up an appointment, please contact 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 at

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

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. 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.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

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