Western Science

Department of Mathematics

Mathematics 4024A/9024 Course Outline

1. Course Information

Course Information
Mathematics 4024A-001: Complex Analysis I and Mathematics 9024: Complex Analysis I. September-December 2026,.

List of Prerequisites
Mathematics 3022A/B or the former Mathematics 2122A/B.

Unless students have either the prerequisites for this course or written special permission from the Department of Mathematics to enroll in it, they may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on their academic record. This decision may not be appealed.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Gord Sinnamon	sinnamon@uwo.ca			

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

Drop-in office hours will be held in-person in MC 103e, days and times may be changed in consultation with the class. To meet outside these times, email the instructor for an appointment. In the email, suggest a **definite day and time** for the meeting and preferred format: in person, Zoom, telephone or other (specify).

3. Course Syllabus, Schedule, Delivery Mode

Calendar 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.

Course-level learning outcomes

1. Demonstrate skills in constructing analysis proofs
2. Recall and apply theorems about functions of one complex variable
3. Perform calculations with complex numbers, complex valued functions, integrals and series

4. Identify analytic functions and use their basic properties.

Lecture Dates and Delivery Mode

Course Topics (Timeline is approximate)

Week 1: The complex plane, solution of the cubic, topology, Riemann sphere
Week 2: Analytic polynomials, power Series, differentiability
Week 3: Cauchy-Riemann equations, exponential, sine and cosine functions
Week 4: Line integrals, closed curve theorem for entire functions
Week 5: Cauchy Integral Formula and Taylor Expansion for entire functions
Week 6: Liouville and Gauss-Lucas Theorem, Fundamental Theorem of Algebra
Week 7: Power series and analyticity; uniqueness, mean-value, and max modulus theorems
Week 8: Open mapping theorem, Schwarz' lemma, Morera's theorem, reflection principle
Week 9: General Cauchy closed curve theorem, the complex logarithm
Week 10: Isolated Singularities, Casorati-Weierstrass, Laurent Expansions
Week 11: Winding Number, Cauchy residue theorem, applications of the residue theorem
Week 12: Definite integrals by contour integration, sums using contour integrals

Classes begin: September 9, 2026
Fall Reading Week: October 10 – 18, 2026
Classes end: December 9, 2026
Exam period: December 11 – 22, 2026

4. Course Materials

Costs of Textbooks and Other Learning Materials/Activities
No cost.

Textbook
Complex Analysis 3e by J. Bak and D. Newman. Springer Undergraduate Texts in Mathematics. Free download available from the Western Libraries: From https://ocul-uwo.primo.exlibrisgroup.com/permalink/01OCUL_UWO/f0kqif/alma9910443502568051 63 you have two choices.

- Click "Scholars Portal Books: Springer 2010" to view online or download chapters
- Click "Springer Nature - Springer English International eBooks 2010" to download entire book

Optional Supplementary Textbook
Complex Analysis in the Spirit of Lipman Bers 2e by Rubí E. Rodríguez , Irwin Kra , Jane P. Gilman. Published in 2013 by Springer. Free download from Western Libraries, see https://ocul-uwo.primo.exlibrisgroup.com/permalink/01OCUL_UWO/f0kqif/alma9910443467289051 63

All course material will be posted to OWL Brightspace: https://westernu.brightspace.com/

Students are responsible for checking the course OWL Brightspace site regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

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

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Assignments (best 4 out of 5)	12%	Due Sep 23, Oct 7, Oct 28, Nov 11, Nov 25 in class
Two In-class Midterms	30%	Oct 21, Nov 18 (Each 50 minutes long.)
Final Exam	58%	To be scheduled by the registrar (Three hours.)

Tentative List of Topics
For the approximate range of topics covered on each in-class midterm, see the above list of topics. Detailed information for each midterm will be announced at least one week before the midterm.

Use of Generative AI Tools
Use by students is prohibited. Such tools will not be used in preparation of course materials or in assessment of student work.

Information about Missed Coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs,* posted on the Academic Calendar: https://uwo.ca/univsec//pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person. The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/
All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

Midterms and Tests

This course has two midterm tests and a **cumulative** final exam. There is no makeup test for a missed midterm. If a student misses a midterm, its weight will shift automatically to their final exam grade. If their final exam grade is higher than their midterm grade, their final exam grade will replace the midterm's weight in their overall grade. They do not need to request Academic Consideration for a missed midterm; the reweighing will be done automatically.

The only exception is an early sitting, offered solely for a university-sanctioned schedule conflict (e.g., conflict of two midterms, Varsity competitions) or a religious accommodation that prevents a student from writing the midterm at its scheduled time. If a student requires this accommodation, they must notify their instructor in writing no later than one week before the test. No other

circumstance, including illness, qualifies for an early sitting or makeup; these are addressed through the automatic reweighting described above.

Assignments
This course has five assignments. Students are expected to complete four to receive full credit for this component. If they miss up to one of the five, they do not need to request Academic Consideration; the missing item(s) will not count against them, and their grade for this component will be calculated from their best four submissions.

If a student completes fewer than four of the total, the missing items will be recorded as a zero and included in their grade for this component. They are encouraged to submit all work, even if incomplete, since a partial mark is always better than a zero. If their final exam grade is higher than their grade on this component, their final exam grade will replace it.

Deadlines: The 48-Hour No-Late-Penalty Period
All take-home assignments, quizzes, and labs with a stated due date include an automatic 48-hour period after the deadline during which students may still submit without a late penalty. For example, if an assignment is due on November 5, they may submit it until November 7 without penalty. After this 48-hour period, no further submissions will be accepted, and students do not need to request Academic Consideration for a missed deadline; their grade for this component will be calculated as described above.

Special Examination
Per university policy, Academic Consideration requests with supporting documentation are required for the final examinations scheduled during official examination periods by the Registrar's Office.

If the student has been approved by the Academic Advising Office to write a Special Examination (SPC) and the final exam is their only outstanding course component, an SPC will be assigned to them and scheduled by the instructor per university policy.

If the student misses their SPC exam and is approved for Academic Consideration, they will be withdrawn from the course without academic penalty. If they experienced extenuating circumstances such as prolonged illness, they may appeal to the Associate Dean (Academic), on a case-by-case basis, for the opportunity to write the final exam the next time the course is offered. An outstanding SPC will reduce their course load for the term in which the exam is deferred, as outlined in the Definitions of Types of Examinations policy.

If the student misses their SPC exam and Academic Consideration is not approved, or was not requested, they will receive a grade of zero on the exam.

6. Additional Statements

6.1 Religious Accommodation
When a recognized religious holiday either requires a student to be absent from the University, or requires or prohibits an activity that makes it impossible for them to complete an academic requirement scheduled that day, they are entitled to accommodation. No student will be penalized for an absence for religious reasons, and an alternative means of satisfying the requirement will be arranged. This accommodation is provided in accordance with the University's policy on Accommodation for Religious Holidays:

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

The student should submit their requests through the Student Absence Portal (SAP), identifying the conflict and the specific course component(s) affected (e.g., test, midterm, exam).

Midterms and Tests: If a religious observance conflicts with a midterm test, they must submit their request no later than **one week** before the test. Their instructor will arrange an early sitting of the test. As set out above, no makeup test is offered for any other reason; this early sitting is available specifically for this accommodation.

Final Examinations: If a religious observance conflicts with the final exam, the student must submit their request no later than **two weeks** before the exam. Their instructor will arrange a Special Examination to take place no later than one month after the end of the examination period.

Students are responsible for finding out what was covered in any class they miss due to a religious observance, and for taking the appropriate steps to keep up with the course.

If a suitable arrangement cannot be reached between a student and their instructor, they should consult the Undergraduate Chair of the department offering the course, and if necessary, the Associate Dean (Academic) of the Faculty of Science.

For a list of recognized religious observances, please visit the calendars posted on the Equity, Diversity & Inclusion website - https://www.edi.uwo.ca (About Us – Resources – Additional Resources – Calendars).

6.2 Academic 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.

6.3 General Academic Policies

The website for Registrar Services is https://www.registrar.uwo.ca/.

Use of @uwo.ca email: 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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as "appeals")

Policy on Request for Relief from Academic Decision:
https://uwo.ca/univsec//pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

Procedures on Request for Relief from Academic Decision (Graduate):

https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences:
https://uwo.ca/univsec//pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Procedures on Scholastic Offences (Graduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the **possession** of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, hidden cameras and wireless earbuds.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at a student's desk, on their person, or within reach during an assessment will be treated as a scholastic offence, **even if the device is not in use**.

Effective September 2026, the typical penalty for this offence is a failing grade in the course AND a 12-month prohibition on retaking the course.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is their responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is the student's responsibility to seek clarification before using any AI tools in academic work.

Use of Software for Assessments

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

6.5 Support Services

Academic Advising. Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, exam conflicts, and many other academic-related matters: https://www.uwo.ca/sci/advising/.

Mental Health Support. 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.

Gender-Based and Sexual Violence. Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If a student has experienced GBSV (either recently or in the past), they can 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.

Accessibility for Coursework. A student may contact the course instructor if they require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to them. If they have any questions regarding accommodations, they may also contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html

Learning Development and Success. Learning-skills counsellors at Learning Development and Success (https://learning.uwo.ca) are ready to help students improve their learning skills. The facility offers 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.

Student Councils.
Student-run support services are offered by the University Students' Council (https://westernusc.ca) and the Science Students' Council (https://www.westernssc.ca).