MATH 3260 Course Outline

General Information

Course Title: Complex Analysis

Prerequisite(s): MATH*2200

Course Description: This course extends calculus to cover functions of a complex variable; it introduces complex variable techniques which are very useful for mathematics, the physical sciences and engineering. Topics include complex differentiation, planar mappings, analytic and harmonic functions, contour integration, Taylor and Laurent series, the residue calculus and its application to the computation of trigonometric and improper integrals, conformal mapping and the Dirichlet problem.

Credit Weight: 0.5

Academic Department (or campus): Mathematics & Statistics

Campus: University of Guelph

Semester Offering: Winter 2022

Class Schedule and Location: MWF 9:30-10:30 in Alexander Hall 218 (N.B. for at least the first two weeks of the semester, all classes are online. Zoom link to be posted on courselink.)

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via Courselink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.

Instructor Information

Instructor Name: Rajesh Pereira
Instructor Email: pereirar@uoguelph.ca
Office location and office hours: MacNaughton 519, Office Hrs TBA

Course Content

Specific Learning Outcomes: Students in this course will learn the basic ideas and tools of complex analysis. Students will learn the arithmetic properties of the complex number plane and will learn how calculus generalizes to functions of a complex variable. Students will see how complex variable can be introduced to simply certain purely real problems such as evaluating certain real improper integrals.

Lecture Content: The development of complex analysis was a major turning point in the history of mathematics and a key building block of modern mathematics. We will explore these topics in the course outline in detail and develop the mathematical tools needed to study them. Specific topics are listed below.

Complex functions as planar mappings. Algebraic and geometric properties of the complex derivative.
Analytic functions and the Cauchy-Riemann equations. Harmonic functions.
Exponential, logarithmic and trigonometric functions on the complex plane.
Contour integration. Cauchy's theorem and formulae. The maximum modulus principle.
The Fundamental Theorem of Algebra. Applications to Matrix Theory.
Taylor and Laurent Series. Analytic continuation.
Isolated singularities. The residue calculus and some of its applications.
Introduction to conformal mapping and the Dirichlet problem.

Course Assignments and Tests:

Marking Scheme: Assignments 25%
Midterm   20%
Final Exam   55%

You must pass either the Midterm or the Final Exam in order to be eligible to pass this course. Failure to do so will result in a final grade that is capped at 48%.

There will be six assignments.   The assignment due dates will be tentatively and approximately set to be January 24th, February 4th, February 18th, March 4nd, March 14th, March 25th

Midterms: TBA but tentatively at February 15th from 5:30-6:50
Final examination date and time: Tuesday April 12th 2:30-4:30
Final Examination regulations are detailed at:
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-exam.shtml

Course Resources
Schaum's Outline of Complex Variables, 2nd ed. by Murray R. Spiegel, Seymour Lipschutz, and John J. Schiller

Course Policies

Course Policy on Group Work: While you may consult with one another or any reference about the general ideas on assignments, any written work must be your own. It is not permitted to ask someone for step by step guidance on assignment problem nor to copy from the work of another student or any other source**.**

University Policies and Information

The following are standard statements for inclusion on all course outlines (adapted with permission from the College of Arts).

Disclaimer

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Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

COVID-19 Safety Protocols

For information on current safety protocols, follow these links:

- https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/
- https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, that these guidelines may be updated as required in response to evolving University, Public Health or government directives.

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar.

Copies of Out-Of-Class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

More information: www.uoguelph.ca/sas

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and

students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The [Academic Misconduct Policy](#) is outlined in the Undergraduate Calendar.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The [Academic Calendars](#) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.