

**The University of Iowa  
The College of Liberal Arts and Sciences  
Spring 2024**

**Title of Course: MATH 5210: Introduction to Analysis II**

**Course meeting time and place:**

Lecture: **2:30P – 3:20P MWF, 205 MLH**

**Department of Mathematics:** <https://math.uiowa.edu/>

**Course ICON site:** To access the course site, log into [Iowa Courses Online \(ICON\)](https://icon.uiowa.edu/index.shtml) <https://icon.uiowa.edu/index.shtml> using your Hawk ID and password.

**Course Home**

The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the policies and procedures for its courses. Graduate students, however, must adhere to the [academic deadlines set by the Graduate College](#).

**Instructor: Raúl E. Curto**

Office location: **225H MLH**

Office hours: **Mon: 10:30 – 11:20 in 225H MLH; Wed: 10:30 – 11:20 via Zoom; Thu: 11:00 – 11:50 via Zoom; or by appointment.**

Phone: **(319)467-0303**

E-mail: [raul-curto@uiowa.edu](mailto:raul-curto@uiowa.edu)

DEO: Professor Ryan Kinser, [ryan-kinser@uiowa.edu](mailto:ryan-kinser@uiowa.edu), 14 MLH

**Course Description:** Local theory of analytic functions of one complex variable, power series, classical transcendental functions; spaces of functions.

Grades are based on homework, midterms, and a final exam.

**Objectives and Goals of the Course**

The main objective of the course is to introduce the student to the mathematical theory of functions of one complex variable, a subject of considerable beauty and with applications to functional analysis, operator theory, topology, geometry, analysis of ODE and PDE, dynamical systems, and various areas of applied mathematics. The course covers in detail many fundamental concepts in analysis such as analytic functions, conformal mappings, classification of singularities, Cauchy theory and applications to the calculus of residues, harmonic functions, the maximum modulus principle, the Riemann mapping theorem, and factorization theorems.

The course is intended to help students develop the tools and techniques needed to tackle and solve challenging mathematical problems. In conjunction with MATH:5200,

the course is expected to equip students with the solid preparation needed to attempt the Ph.D. Qualifying Exam in Analysis.

### **Required text**

*Functions of One Complex Variable I*, 2<sup>nd</sup> edition, by John B. Conway, Graduate Texts in Mathematics, Springer, 1978.

### **Material to be covered**

Chapter I. The Complex Number System

Chapter II. Metric Spaces and the Topology of  $\mathbf{C}$

Chapter III. Elementary Properties and Examples of Analytic Functions

Chapter IV. Complex Integration

Chapter V. Singularities

Chapter VI. The Maximum Modulus Theorem

Chapter VII. Compactness and Convergence in the Space of Analytic Functions

Chapter VIII. Runge's Theorem

Chapter X. Harmonic Functions

Chapter XI. Entire Functions

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### **TENTATIVE TIMETABLE (Subject to change; all changes will be announced in class, posted on the course webpage or e-mailed to your UI e-mail.)**

**Week 1:** I.1, I.2, I.3, I.4, I.5

**Week 2:** I.6, II.1, II.2, II.3, II.4, II.5, II.6

**Week 3:** III.1, III.2

**Week 4:** III.3, IV.1

**Week 5:** IV.2, IV.3, IV.4, IV.5

**Week 6:** IV.5 revisited; Review for Midterm 1; Midterm 1 Answer Key

**Midterm Exam 1** (Thu of Week 6) (based on material covered during Weeks 1 – 5)

**Week 7:** IV.6, IV.7, IV.8

**Week 8:** V.1, V.2

**Week 9:** V.3, VI.1, VI.2, VII.1

**Week 10:** VII.2, VII.3, VII.4

**Week 11:** VII.4 revisited; Review for Midterm 2; Midterm 2 Answer Key

**Midterm Exam 2** (Thu of Week 11) (based on material covered during Weeks 6 – 10)

**Week 12:** VII.5, VII.6, VII.7

**Week 13:** VIII.1, VIII.2, VIII.3

**Week 14:** X.1, X.2, XI.1

**Week 15:** XI.2; Review for Final Exam

**Final Exam** (Week 16; date, time and location TBD, see below) (based on material covered during Weeks 1-5 (25%), 6-10 (25%) and 11 – 15 (50%))

### **Academic Honesty and Misconduct**

All students in CLAS courses are expected to abide by the [CLAS Code of Academic Honesty](#). Graduate academic misconduct must be reported to the Graduate College according to Section F of the [Graduate College Manual](#).

### **Student Complaints**

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course.

Graduate students should contact the CLAS [Associate Dean for Graduate Education and Outreach and Engagement](#) when additional support is needed.

### **Drop Deadline for this Course**

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the [drop deadline for this course](#) here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the [Registrar’s website](#). Undergraduate students can find policies on dropping and withdrawing [here](#). Graduate students should adhere to the [academic deadlines](#) and policies set by the Graduate College.

### **Grading System and the Use of +/-**

With **criterion-reference grading**, students receive grades based on the quality of their work in relation to the criteria defined by the instructor and by the rubrics or models specifying the qualities of each grade. The cut scores (e.g. 90 for A-) will never go up, but they may go down for some exams, and each exam will be treated separately.

Final grades will be awarded based on the following ranges:

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
A+ 97-100	B+ 87-90	C+ 76-79	D+ 61-64	F < 50
A 93-96	B 83-86	C 71-75	D 56-60	
A- 90-92	B- 80-82	C- 65-70	D- 50-55	

**Grading System: Plus/minus** grading will be used. Final course grades will be assessed based on your performance in the following activities:

50% 2 Evening midterms (see below)

25% Final exam (date, time, and place to be announced)

25% Twelve Homework sets, assigned weekly, and due at 5 pm CST on Friday of Weeks 2, 3, 4 and 5; Monday of Week 7; Friday of Weeks 8, 9 and 10; Monday of Week 12; Friday of Weeks 13 and 14; and Monday of Week 16. The two lowest scores will be dropped.

**Regular and prompt attendance is required**; class participation is strongly encouraged.

**All exams will be cumulatively comprehensive.**

### **Midterm Exams**

Start and end times: **6:30PM - 8:30PM 02/22/2024 Thu**; 106 GILH

Start and end times: **6:30PM - 8:30PM 04/04/2024 Thu**; 106 GILH

### **Date and Time of the Final Exam**

The final examination date and time will be announced by the Registrar generally by the fifth week of classes, and it will be announced on the course ICON site once it is known. **Do not plan your end-of-the-semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam.** According to Registrar's final exam policy, students **have a maximum of two weeks after the announced final exam schedule** to request a change if an exam conflict exists or if a student has more than two exams in one day (see the [policy](#) here).

## **College of Liberal Arts and Sciences (CLAS) Course Policies**

### **Attendance and Absences**

*University regulations require that students be allowed to make up examinations which have been missed due to illness or other unavoidable circumstances. Students with mandatory religious obligations or UI authorized activities must discuss their absences with me as soon as possible. Religious obligations must be communicated within the first three weeks of classes.*

### **Exam Policies**

#### **Communication: UI Email**

Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community.

**Calculator Use:** The use of a calculator or any other electronic device in the midterms and final exam is not allowed. When you are doing your HW (to prepare you for your exams), keep in mind that you will not have a calculator in the exams.

**Student Collaboration:** Student collaboration is NOT permitted on the midterms and final exam. Any attempt to collaborate during these exams will result in a score of 0 on that test.

**Late Homework** will not be accepted; however, the two lowest scores will be dropped.

Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students are encouraged to talk to their instructor for assistance with specific class-related concerns. For additional support and counseling, students are encouraged to contact University Counseling Service (UCS). Information about UCS, including resources and how to schedule an appointment, can be found at [counseling.uiowa.edu](https://counseling.uiowa.edu). Find out more about UI mental health services at [mentalhealth.uiowa.edu](https://mentalhealth.uiowa.edu).

**Student Care and Assistance** provides assistance to University of Iowa students who are experiencing a variety of crisis and emergency situations, including but not limited to medical issues, family emergencies, unexpected challenges, and sourcing basic needs such as food and shelter. More information on the resources related to basic needs can be found at [basicneeds.uiowa.edu/resources/](https://basicneeds.uiowa.edu/resources/). Students are encouraged to contact Student Care & Assistance in the Office of the Dean of Students (Room 135 IMU, [doassistance@uiowa.edu](mailto:doassistance@uiowa.edu), or 319-335-1162) for support and assistance with resources.

### **Accommodations for Students with Disabilities**

The University is committed to providing an educational experience that is accessible to all. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through [Student Disability Services](#) (SDS). SDS is responsible for making Letters of Accommodation (LOA) available. The student must provide an LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated. The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Additional information can be found on the [SDS website](#).

## **University Policies**

[Classroom Expectations](#)

[Free Speech and Expression](#)

[Non-discrimination](#)

[Absences for Religious Holy Days](#)

[Sexual Harassment/Misconduct and Supportive Measures](#)

[Sharing of Class Recordings](#)