UCONN
UNIVERSITY OF CONNECTICUT

Math 2710-002
Transition to Advanced Mathematics
Spring 2023

Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course and Instructor Information

Course Title: Transition to Advanced Mathematics
Credits: 3
Mode/Format: In-Person
Prerequisites: MATH 1132Q or 1152Q. May not be taken for credit after passing MATH 2143. May not be taken out of sequence after passing 3150, 3210, 3230, 3240, 3260, 3270, 3330, or 3370.

Professor: Katie Hall, (You can call me Katie or Professor Hall)
Pronouns: (she/her/hers)
Email: katie.hall@uconn.edu. You may also post public or private (just to me) messages on Campuswire. You can expect a response on Campuswire within a few hours (during the week) and via e-mail within 48 hours.

Office Hours/Availability: I will (tentatively) have office hours on Monday from 3-4:30 and Wednesday from 1:30-3:00. You are welcome to stop by to ask questions or discuss course material without an appointment during these times. If you are unavailable during these times (or they are too busy), feel free to reach out to me and we can schedule an appointment to meet at another time.

Course Materials

Required Materials:

- Richard Hammack, Book of Proof: Third Edition. Available as a free online book. Or you can get a hardcopy.
- Campuswire: Free Account

Recommended Materials:

- ChatGPT: Free Account

Additional course readings and media are available within HuskyCT.

Course Description

From the course catalog: Basic concepts, principles, and techniques of mathematical proof common to higher mathematics. Logic, set theory, counting principles, mathematical induction, relations, functions. Concepts from abstract algebra and analysis. Students intending to major in mathematics should ordinarily take this course during the third or fourth semester.

The main objective in this course is for you to learn to read and write proofs while gaining knowledge and skills in some math topics. You will be asked to transition from solving basic questions with a prescribed technique to thinking critically about what a question is asking and determining what the best approach is to solve it. We will explore the topics of logic, set theory, counting principles, mathematical induction, relations, functions and analysis. We will learn what a proof is, what it entails, how we can go about thinking about writing one. We will also learn what types of statements we can and can't prove, how to determine if a statement is true and how to critically read proof. In addition to writing proofs, we will learn several techniques and definitions important for high level math courses.

Course Objectives

At the end of the course, you will

- be able to summarize the role of axioms, definitions, theorems and proofs in mathematics both orally and in writing.

- be able to summarize methods of proof (including direct proof, contrapositive, contradiction, and induction) and disproof (including the use of counterexamples) and be able to determine when each is applicable.
- be able to read a mathematical proof and summarize its main ideas and structure.

have a working understanding of basic set theory, basic number theory, relations, functions, cardinality, rational numbers, limits of sequences and functions and complex numbers.

Course Outline

Each week, there are several sections of material we will cover, outlined in the calendar below. The typical class structure will be as follows:

- Pre-class: there will be a few short videos for you to watch giving you an overview of the day's material.
- In class: we will spend the first 30 or so minutes of class going over questions from the day's material and some sample proofs. Then we will break into small groups for you to work on the weekly problems.

Calendar

Week and Dates	Book Section	Topics
1:1/17-1/20	1.1-1.4	Sets
2: 1/23-1/27	1.5-1.10, Some Ch 8	Sets
3: 1/30-2/3	2.1-2.6	Logic
4: 2/6-2/10	2.7-2.12	Logic
5: 2/13-2/17	**Practice Exam,** Ch 4	Direct Proof
6: 2/20-2/24	Ch 5 and 6	Contrapositive and Contradiction
7: 2/27-3/3	**Exam 1**, Ch 7	Proving Non-Conditional Statements
8: 3/6-3/10	Ch 8 and 9	Proofs with sets and disproof
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9: 3/20-3/24	Ch 10	Induction
10: 3/27-3/31	Ch 3 and 10	Combinatorics and more inductions
11: 4/3-4/7	**Exam 2**, Ch 11	Relations
12: 4/10 -4/14	Ch 12	Functions
13: 4/17-4/21	Ch 13	Proofs in Calculus
14: 4/24-4/28	Ch 14	Cardinality of Sets
Finals Week	**Cumulative Final Exam**	

Course Requirements and Grading

Category	Overview	Points Available	Percent

Category 1: Videos and Problems Sets	Watch Pre-Class Videos and complete video assignment, Participate in in-class problem solving, post solutions to Campuswire	100 (about 116 available must earn 100 to get full points, max is 100)	20%
Extra Questions	Exam Question Writing, ChatGPT Analysis, Extra HW problems, Viral Math	Must earn 50 points to get full credit. Can earn up to 60 for extra credit.	10%
Practice Exam	In class on Feb 13. Can do corrections after.	50	10%
Exam 1	In class on Feb 27.	100	20%
Exam 2	In class on April 3.	100	20%
Final Exam	In-person, at day and time schedule by university	100	20%

Videos and Problem Sets

There are three ways to earn points in this category. (You should do all three)

1. Before each class period, you will be asked to watch one to three short videos and take a video quiz. Each set of videos and video quizzes completed will earn you one point.
2. In class, I will do a quick overview of what was covered in the videos and answer questions students have. Then you will be asked to work in groups on problems from the weekly problem set. Active participation in class earns one point a day.
3. Each week, you will be assigned to write and/or referee solutions to problems from the weekly problem set. These will be done on Campuswire. Correct solutions and/or good feedback will earn you 3 points per problem set.

There will be about 116 points available in this category. You must earn at least 100 to get full credit. Points over 100 will not count towards your final grade.

Extra Questions

There are five (or more) ways to earn points in the extra questions category.

1. Each week you will have an opportunity to complete a “Exam Question” assignment. Details are posted on HuskyCT. Each exam question assignment is worth 6 points. If you do an Exam Question, that can be your only “Extra Question” for the week. This will be submitted in **Gradescope**.
2. You can complete a ChatGPT analysis. Pick a question from the homework (that you’ve already completed on your own) or from the book and have ChatGPT produce a solution to it. Then “grade” this solution by commenting on what is correct and incorrect. And what could be done better. Each ChatGPT analysis is worth 2-3 points. This will be submitted to **Gradescope**.
3. You can complete non-assigned problems on HW and post solutions to **Campuswire**. Only three students can post solutions to each challenge question. One student can referee all three posts for each question. (So 4 people total per question) Each challenge question is worth three points.
4. You can complete a write-up on a Viral Math topic. You can find some examples in the Google folder or find your own. Post about these on **Gradescope**. Your writing should include the answer to the question, an explanation of why that is the answer and any

"controversial" answers. Indicate what "flaws" led to this problem being controversial. Feel free to include links or screenshots to people's posts about this problem or news stories about it. A basic response will earn one point. A really good one will earn two.

5. You can write a solution to a math puzzle problem (see the pirate puzzles and Museum of Math problems in HuskyCT.) You can work together on these but write up your answers separately. Submit these to **Gradescope.** These are worth 2-5 points, depending on how difficult they are.
6. Other Opportunities to earn points in this category will be announced in class.

You must earn 50 points by the end of the semester in this category to get full credit. You can earn up to 60 points to get some extra credit.

Practice Exam

There will be an in class practice exam on Monday, Feb 13 for the full class period. The exam is meant to give you an idea of how you are doing in the class and if your study techniques are effective. It will be graded for correctness but you will have the opportunity to do corrections after the exam to earn points back. This is worth 10% of your final grade.

Exams

There are two midterm exams and a cumulative final exam. The exams are:

- Monday, Feb 27, 2023 covering Chapter 1, 2, 4, 5, and 6
- Monday, Apr 3, 2023 covering Chapter 7, 8, 9, 10 and 3.
- Final Exam Date TBA, Cumulative, Chapters 1-14.

Each exam, including the final exam, is out of 100 points. The final exam will replace your lowest score from the previous exams if it is higher.

For additional information on undergraduate grading policies see here: https://registrar.uconn.edu/grades/

Grading Scale:

Grade/ Points Earn	Letter Grade	GPA
93-100	A	4.0
90-92.9	A-	3.7
87-89.9	B+	3.3
83-86.9	B	3.0
80-82.9	B-	2.7
77-79.9	C+	2.3
73-76.9	C	2.0
70-72.9	C-	1.7
67-69.9	D+	1.3
63-66.9	D	1.0
60-62.9	D-	0.7
<60	F	0.0

Due Dates and Late Policy

All homework due dates will be published on each assignment. Late homework will be accepted for half credit.

Feedback and Grades

I will make every effort to provide feedback and grades within one week. To keep track of your performance in the course, refer to My Grades in HuskyCT.

Weekly Time Commitment

You should expect to dedicate 9 to 12 hours a week to this course. This expectation is based on the various course activities, assignments, and assessments and the University of Connecticut's policy regarding credit hours. (More information related to hours per week per credit can be accessed at the Online Student website).

How to Succeed in this Course

In order to become a successful proof writer, you must take some time to write proofs! But before you can write the proof, you must know what you need to show (and how to show it). Practice starting from a statement you haven't seen before and thinking how to prove it. Try something. If you get stuck, back up and try again. Don't be afraid to go down a wrong path. Even if it doesn't get to where you want to go, you might see something interesting along the way.

You should practice writing out proofs for problems, even if they aren't assigned to you. Compare what you write to what is posted. How are they the same and how are they different? Being able to look at someone else's proof and determine if it is valid will help you do the same for yours.

This class requires different skills (and more creativity and complex thinking) than other classes you've probably taken. There are going to be times it feels hard! That's OK! Reach out. I am here to help.

(From CETL, but I believe and support it) All students can succeed in this course and I am here to help you along the way. Please do not hesitate to ask questions or attend office hours. All questions are important here. Success in this course program depends heavily on your personal health and well-being. Recognize that stress is an expected part of the college experience, and it often can be compounded by unexpected setbacks or life changes outside the classroom. I strongly encourage you to reframe challenges as an unavoidable pathway to success. Reflect on your role in taking care of yourself throughout the semester, before the demands of exams and projects reach their peak. Please feel free to reach out to me about any difficulty you may be having that may impact your performance in your courses or campus life as soon as it occurs and before it becomes too overwhelming. In addition to your academic advisor, I strongly encourage you to contact the many other support services on campus that stand ready to assist you.

Additional support is available here: Dean of Students Office, Academic Achievement Center, Writing Center, Quantitative Learning Center, Center for Students with Disabilities, Title IX Office, Student Health and Wellness -- Mental Health, etc.

Importance of Inclusivity

Throughout this course, you will be asked to interact with me and your classmates in different ways. Through these interactions, it is important to be mindful of the diversity of background and experience each of us brings to the class. I will do my best to ensure each student in the class has equitable access to the course material as well as to opportunities to earn credit. I ask when you are working with other students you create a good environment for your classmates. This might take the form of using someone's preferred pronouns, acknowledging differences in learning styles or background knowledge, or respecting someone's choice to maintain physical distance in the classroom space. If at any time you feel that you or someone around is not being treated respectfully, please do not hesitate to let me know.

Resources for Students Experiencing Distress

The University of Connecticut is committed to supporting students in their mental health, their psychological and social well-being, and their connection to their academic experience and overall wellness. The university believes that academic, personal, and professional development can flourish only when each member of our community is assured equitable access to mental health services. The university aims to make access to mental health attainable while fostering a community reflecting equity and diversity and understands that good mental health may lead to personal and professional growth, greater self-awareness, increased social engagement, enhanced academic success, and campus and community involvement.

Students who feel they may benefit from speaking with a mental health professional can find support and resources through the **Student Health and Wellness-Mental Health** (SHaW-MH) office. Through SHaW-MH, students can make

an appointment with a mental health professional and engage in confidential conversations or seek recommendations or referrals for any mental health or psychological concern.

Mental health services are included as part of the university's student health insurance plan and also partially funded through university fees. If you do not have UConn's student health insurance plan, most major insurance plans are also accepted. Students can visit the **Student Health and Wellness-Mental Health located in Storrs on the main campus in the Arjona Building, 4th Floor,** or contact the office at **(860) 486-4705, or https://studenthealth.uconn.edu/** for services or questions**.**

Accommodations for Illness or Extended Absences

Please stay home if you are feeling ill and please go home if you are in class and start to feel ill. If illness prevents you from attending class, it is your responsibility to notify me as soon as possible. You do not need to disclose the nature of your illness, however, you will need to work with me to determine how you will complete coursework during your absence.

If life circumstances are affecting your ability to focus on courses and your UConn experience, students can email the Dean of Students at dos@uconn.edu to request support. Regional campus students should email the Student Services staff at their home campus to request support and faculty notification.

COVID-19 Specific Information: People with COVID-19 have had a wide range of symptoms reported – ranging from mild symptoms to severe illness. These symptoms may appear 2-14 days after exposure to the virus and can include:

- Fever,
- Cough,
- Shortness of breath or difficulty breathing
- Chills
- Repeated shaking with chills
- Muscle pain
- Headache
- Sore throat
- New loss of taste or smell

Additional information including what to do if you test positive or you are informed through contract tracing that you were in contact with someone who tested positive, and answers to other important questions can be found here: https://studenthealth.uconn.edu/updates-events/coronavirus/

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important standards, policies and resources, which include:

- The Student Code
  - Academic Integrity
  - Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or http://csd.uconn.edu/.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government." (Retrieved March 24, 2013 from Blackboard's website)

Software/Technical Requirements (with Accessibility and Privacy Information)

The software/technical requirements for this course include:

- Equipment Recommendations (https://remotework.uconn.edu/equipment-recommendations/)
- HuskyCT/Blackboard (HuskyCT/ Blackboard Accessibility Statement, HuskyCT/ Blackboard Privacy Policy)
- Adobe Acrobat Reader (Adobe Reader Accessibility Statement, Adobe Reader Privacy Policy)
- Google Apps (Google Apps Accessibility, Google for Education Privacy Policy)
- Microsoft Office (free to UConn students through uconn.onthehub.com) (Microsoft Accessibility Statement, Microsoft Privacy Statement)
- Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
- WebCam

Privacy Statement: For information on managing your privacy at the University of Connecticut, visit the University's Privacy page. NOTE: This course has NOT been designed for use with mobile devices.

Help

Technical and Academic Help provides a guide to technical and academic assistance.

This course uses the learning management platform, HuskyCT. If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the Help Center. You also have 24x7 Course Support including access to live chat, phone, and support documents.

Student Technology Training

Student technology training is now available in a new HuskyCT short course created by students for students. It will prepare you to use the IT systems and services that you will use throughout your time at UConn, whether learning online or on-campus. It is available at https://lms.uconn.edu/ultra/courses/_80016_1/cl/outline .

Minimum Technical Skills

To be successful in this course, you will need the following technical skills:

- Use electronic mail with attachments.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics or hyperlinks.
- Work within two or more browser windows simultaneously.
- Open and access PDF files.

Evaluation of Course Experience

Students will be given an opportunity to provide feedback on their course experience and instruction using the University's standard procedures, which are administered by the Office of Institutional Research and Effectiveness (OIRE).

The University of Connecticut is dedicated to supporting and enhancing teaching effectiveness and student learning using a variety of methods. The Student Evaluation of Teaching (SET) is just one tool used to help faculty enhance their teaching. The SET is used for both formative (self-improvement) and summative (evaluation) purposes.

Additional informal formative surveys and other feedback instruments may be administered within the course.