

# MATH 3220 Foundations of Analysis 2

Bronson Lim

Spring 2019

E-mail: [bronson@math.utah.edu](mailto:bronson@math.utah.edu)

Office Hours: MWF 9:30-11:00am or by appt.

Office: JWB 101

Webpage: [math.utah.edu/bronson/teaching/3220-s19](http://math.utah.edu/bronson/teaching/3220-s19)

Class Hours: MTWF 8:35-9:25AM

Class Room: ST 208

---

## Prerequisites and Course Information

- “C” or better in MATH 3210 and (MATH 2250 or MATH 2270).
- MATH 3220, Foundations of Analysis 2, is a 4 credit course.
- Textbook: *Foundations of Analysis* by Joseph L. Taylor.

## Course Description

This is the second course in the Foundations of Analysis two term sequence. The course is on advanced multivariate calculus and will emphasize the further development of the student’s ability to understand more abstract concepts and to write effective and rigorous mathematical arguments. A list of topics is provided below.

## Expected Learning Outcomes

Upon successful completion of this course, a student should be able to:

1. understand the topology of Euclidean space including: determining if a subset of  $\mathbb{R}^d$  is open/closed/compact/connected/path connected, as well as understanding convergence of sequences of vectors.
2. understand functions between Euclidean spaces including: determining continuity, sequences of functions, as well as linear functions and their linear algebraic properties such as the rank-nullity theorem.
3. understand multivariate differentiation including: computing and using the total differential, the chain rule, Taylor’s formula, and the inverse and implicit function theorems.

4. understand multivariate integration including: determining if a region is Jordan, Fubini's theorem, and the change of variables theorem.
5. understand how to use Stoke's theorem and its special cases: Fundamental Theorem of Calculus, Green's Theorem, and Gauss's Theorem.

## Additional Resources

- **Tutoring Center & Computer Lab:** There is free tutoring in the T. Benny Rushing Mathematics Student Center (room 155, the lower level between JWB and LCB), as well as a computer lab. For more information see <http://www.math.utah.edu/ugrad/tutoring.html>
- **Private Tutoring:** University Tutoring Services, 330 SSB. There is also a list of tutors at the math department office JWB 233.

## Course Policy

I will detail the policy for this course below.

## Grading Policy

- 15% of your grade will be determined by your homework scores. You are encouraged to discuss the problem sets among yourselves and with me at office hours, but the final write-up must be your own work. The lowest homework percentage will be dropped. Variable Extra Credit will be given to those students who type their assignments in  $\LaTeX$ .
- 10% of your grade will be determined by problems of the day. This is a daily question that should take no longer than 5-10 minutes to complete. They will be due during the next class meeting.
- 45% of your grade will be determined by three in class exams (that's 15% each). You will have the whole class period to complete the exam. Practice materials will be posted a week prior to the midterm.
- 30% of your grade will be determined by the **cumulative** final exam. Our final exam is Wednesday, May 1, 2019 from 8:00am-10:00am.

## Calculators:

Calculators will not be allowed on exams. They may be used on homework, but you should still write out the details of your computation for credit. It is in your best interest not to become too dependent on your calculator because they cannot be used on 75% of your grade.

## Student Responsibilities

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code (the Code), spelled out in the Student Handbook. Students have specific rights

in the classroom as detailed in Article II of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviour, and I will do so, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee (<http://regulations.utah.edu/academics/6-400.php>).

### **ADA Policy**

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability and Access (CDA), 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the CDA.

### **Addressing Sexual Misconduct**

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with disability, veterans status, or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of the Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677 (COPS).

### **Student Names and Personal Pronouns**

Class rosters are provided to the instructor with the students legal name as well as Preferred first name (if previously entered by you in the Student Profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected. If you need assistance getting your preferred name on your UIDcard, please visit the LGBT Resource Center Room 409 in the Olpin Union Building, or email [bpeacock@sa.utah.edu](mailto:bpeacock@sa.utah.edu) to schedule a time to drop by. The LGBT Resource Center hours are M-F 8am-5pm, and 8am-6pm on Tuesdays.

### **Wellness Statement**

Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of

Utah. For helpful resources contact the Center for Student Wellness at [www.wellness.utah.edu](http://www.wellness.utah.edu) or 801-581-7776.