

MATH 5350/6350, FALL 2021

FUNCTIONAL ANALYSIS

Class Website: Go to www.marktomforde.com, select “Teaching” and “Current Courses”.

On the website you will find homework as it is assigned, as well as a copy of this syllabus, exam dates, and announcements as they are made. NOTE: This course does NOT use Canvas, and no Canvas page will be set up for this class.

Course Description

This course is a proof-based treatment of Functional Analysis. Topics include Banach spaces, Hilbert spaces, linear operators, dual spaces, and spectral theory. Great emphasis will be placed on effective proof writing and communication. Throughout the course students will be exposed to the notation, language, and methods used by professional mathematicians.

Instructor

Dr. Mark Tomforde
Office ENG 289
www.marktomforde.com

Class Meetings

MW 1:40PM--2:55PM in
Osborne B213

Prerequisites

MATH 4320/5320 Analysis II
(Also, knowledge of Metric Spaces and Point-Set Topology is useful.)

Office Hours

MW 3:00PM--3:50PM
Office ENG 289

I encourage you to come by my office if you have questions, need help with homework problems, or want to talk about the material.

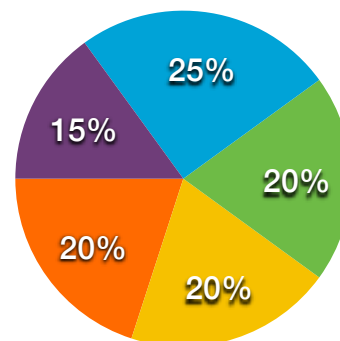
Textbook

A Course in Functional Analysis, 2nd Ed., by John B. Conway
The text will be heavily supplemented by my own notes and lectures from class.

Grading

Your final grade for the class will be determined as follows:

- **Class Participation: 15%**
- **Homework: 25%**
- **Exam 1: 20%**
- **Exam 2: 20%**
- **Final Exam: 20%**



Class Participation

Class participation is based on attendance and how engaged you are in class meetings.

It is vital to attend every class meeting and pay attention, particularly since some lecture material does not appear in the text. Questions on exams will be drawn from homework, reading, and lectures. If you have to miss class for school approved reasons (e.g., school sponsored events, major religious holidays) you need to let me know as soon as possible, and prior to the missed class, for it to not count against your grade. Please keep in mind that class participation is 15% of your final grade, which is significant; a 15% difference in your final score in the class can change your grade by up to two letter grades (e.g., from an A- to a C-, or from a B+ to a D+).

Homework

Homework problems with due dates will be given on the course web page. Your lowest homework score throughout the term will be dropped when calculating your final grade.

This is meant to account for unexpected absences (e.g., illness or getting caught in traffic). Late homework will not be accepted for any reason. You are encouraged to discuss homework problems with others, but the write-up should be done by you alone and in your own words.

Homework Policies

- **Homework is due at the beginning of class on its due date. Late homework will not be accepted. Homework is late once I have started lecturing.**
- **Homework without a name will not be accepted.**
- **Homework will not be accepted by email.**
- **Homework should be written legibly and on only the front side of the paper. Leave enough room for the grader to make comments.**
- **Homework should be stapled in the upper-left-hand corner.**
- **Homework should be written on standard-sized paper (8.5" x 11"), with no "fringe" down the side as a result of the paper having been torn out of a spiral notebook**
- **Homework solutions should be presented in sequential order.**
- **Homework not picked up within one week of when it is returned will be discarded.**

Points will be deducted from homework for each infraction of the above policies.

Writing Proofs

You should think of proofs as writing assignments. When a problem asks you to prove (or show or verify) a proposition, you should write the proof up in “textbook style”. This should include a statement of the proposition you are proving, followed by a proof providing a clear and logically correct argument that explains to the reader why the result is true. Throughout the course you will get feedback on your proof writing, as well as see many examples of correctly written proofs in your textbook and in class. You should be aware at the outset that **your proofs are required to contain complete sentences, proper spelling and grammar, and correct English usage.**

Exams

There will be two exams and one final.

Exam 1: Wednesday, September 29

Exam 2: Wednesday, November 3

Final: Wednesday, December 15, 12:40PM – 2:40PM

Make-Up Policy

Not being present for an exam or turning in late work (e.g., homework, exams) results in a score of zero, and you will not be allowed to make up the work. Exceptions may be made in the event of extreme circumstances, such as a documented, serious illness. In the event that you cannot be present to take an exam on the day it is held you need to speak to me in advance and make every attempt to do the work before (and not after) the rest of the class.

Reading Assignments

Reading assignments will be given weekly on the course web page. Completing the reading assignments is just as critical as doing the written homework. **You should read the assigned sections before we cover them in class**, so that you are prepared to answer questions or ask about material you do not understand.

Math Center and Tutoring

The Math Center < <https://mathcenter.uccs.edu> > provides free tutoring and serves as a place for all UCCS students to do homework on their own, work on assignments with classmates, or just chat about math and math-related topics. Tutors are available to answer questions and to help you improve your understanding of and comfort with math courses. Whether you come in to work on math or just to have coffee, you'll find a welcoming and friendly environment.

Honor Principle

UCCS students are expected to adhere to the Academic Honesty Policy as described in the Student Handbook. In this course this shall mean the following: **Exams shall be worked on independently and without the use of the internet, outside books, or outside sources. Homework may be discussed with others, but the write-up must be done on the student's own and in the student's own words, without the help of other people or outside sources. If you are aware of anyone who is cheating or receiving unfair outside assistance, you are honor bound to inform the professor of what is occurring, and you will be considered an accomplice if you do not.** Anyone caught cheating will receive a failing grade in the course and be reported to the department chair and dean for further disciplinary action.

What Constitutes Cheating?

Your peers or other students may try to convince you that certain questionable activities or services are legitimate. Please be aware that the following are definite and unquestionable instances of cheating:

- Obtaining a Solutions Manual for the Course Textbook, and copying (all or part of) a solution to an assigned problem from the book.
- Googling a problem and copying the solution, especially if it is done so without understanding what you are writing.
- Using online services such as Chegg, Course Hero, Slader, Quizlet, etc. These businesses often bill themselves as “online learning platforms” and claim to provide legitimate assistance for students. In reality they are for-profit organizations that use deceptive and illegal business practices. Most of these businesses are guilty of copyright violations, privacy infringement, and unauthorized uses of material. It is also the case that a surprising number of their so-called “solutions” are incorrect. These businesses exist to take your money, and while they may temporarily help you to boost a grade in a course by allowing you to copy correct answers, the materials they provide actually obstruct your learning rather than facilitate it. You are far better off going to office hours, PASS meetings, and the Math Center, all of which are free and will help you to *actually learn the material* by building effective learning skills that will assist you in internalizing and applying the material.

Classroom Environment

As your professor, I hold the fundamental belief that everyone has a right to learn and deserves unrestricted access to education. I also believe that everyone in this class is fully capable of mastering the material. I value diversity, social justice, inclusion, and equality. I am therefore committed to creating a classroom environment that welcomes all students, regardless of race, gender, social class, sexual orientation, religious beliefs, etc. If there is anything causing barriers to your inclusion or achievement, please come talk to me. Likewise, any student with a disability or chronic health problem should talk to me about the types of assistance that might be offered.

UCCS Wellness Center

The UCCS Wellness Center provides Mental Health Services to assist UCCS students. If you are experiencing personal or psychological matters that are complicating and interfering with your academic performance or your life, please reach out to them to see what assistance they can provide.

Mental Health Services Website: < <https://recwellness.uccs.edu/mental-health-services> >

If you would like to schedule an appointment with Mental Health Services, please call 719-255-4444.

Mental Health Services also provides an anonymous and free mental health screening module that you can access online: < <https://screening.mentalhealthscreening.org/uccs> >.

Mental Health Clinicians are available in person for emergency/crisis sessions Monday – Friday, 8:00AM – 5:00PM. If you need help for a crisis or an emergency outside of office hours, call 911 or go to your nearest emergency room.

Mask Mandate for Fall 2021

Official UCCS Statement on Face Coverings: All students are expected to wear face coverings while inside all UCCS buildings/facilities. Guidance and exceptions to wearing a face covering can be read in the full executive directive < <https://vcf.uccs.edu/policies/uccs/policies> >. Students may be asked to leave the class if they are not wearing a face covering, and additional disciplinary action may result in accordance with the Student Code of Conduct.

Note: For teaching purposes, if an instructor has been immunized and can maintain 10 feet distance from their students, that instructor may remove their face covering while teaching.

COVID-19

If you have tested positive for COVID, are exhibiting symptoms of COVID, or have been exposed to someone with COVID, please do not come to class. Instead, contact the instructor to make arrangements for turning in work and getting copies of class notes. Absences that occur to prevent COVID exposure will not count against your class attendance or class participation.

Important Dates

The following are some important dates you should keep in mind:

August 23, First Day of Classes

September 6, Labor Day, No Class

September 29, Exam 1

October 29, Last Day to Drop Full Semester Courses without Dean/Instructor Approval

November 3, Exam 2

November 24 -- November 28, Thanksgiving Break, No Class

December 13 -- 16, Finals Week

December 15, Final Exam scheduled from 12:40PM -- 2:40PM