

Syllabus

1.1 Instructor Information

Instructor:	Dr. Bevin Maultsby
Moodle Page:	https://moodle-courses1718.wolfware.ncsu.edu/course/view.php?id=53
Communication:	Moodle will be used for most communications in this course. In particular, math questions should be asked in class, in office hours, or on the Moodle forum. In general, I will not answer math questions sent by email. You are encouraged to discuss concepts and homework (with discretion) in the Moodle forum.
Office Hours:	– Tuesday 12:40–1:40pm – Thursday 2:50–3:50pm – Friday 10:15–11:15am – by appointment
Office:	SAS Hall 3230
Class:	MWF, 11:45am–12:35pm in Daniels Hall 214 Thursday, 11:45am–12:35pm in Poe Hall 211
Instructor Contact:	bmaults@ncsu.edu , 919-515-1876 (no voicemail)

1.2 Course prerequisites or restrictive statements.

Prerequisite: MA 225.

MA 407 is desirable but not required.

Credit is not allowed for both MA 425 and MA 511.

1.3 GEP Designation

This class does not satisfy a GEP requirement.

1.4 Textbook Information

Required: *Introduction to Real Analysis* by Robert Bartle and Donald Sherbert, 4th Edition.
ISBN: 9780471433316

Optional: In addition to the assigned book, you may find the following books helpful

- *Understanding Analysis* by Stephen Abbott (**Highly recommended.**)
- *The Way of Analysis* by Robert Strichartz
- *Principles of Mathematical Analysis* by Walter Rudin

1.5 Course Description

We will cover all or parts of Chapters 1–11. Topics will be the real number system, functions and limits, topology on the real line, continuity, differential and integral calculus for functions of one variable, infinite series, uniform convergence.

We will focus much of our attention on learning to write mathematical proofs. Proofs will be graded not only for content but also for writing and style. (A mathematically correct proof which is poorly written may receive a low grade.)

1.6 Learning Outcomes

Goal: MA 425 is an introduction to mathematical analysis with particular emphasis on writing clear and rigorous proofs. Students will

- develop an understanding of the theory underpinning the calculus.
- develop their proof skills in one-dimensional calculus,
- understand the concepts of the real number system, functions, limits, continuity, differential and integral calculus of one variable, and uniform convergence.

1.7 Course structure

In general this course will consist of three lectures per week (MWF) and an extra session on Thursday. Lectures will be interactive and students are encouraged to come to class prepared for discussions and activities.

Thursday sessions may be structured or unstructured depending on the week, and the instructor may choose to use Thursday's class for lectures or exam reviews.

Quizzes. MA 425 is an exceptionally challenging course for most students. **Reading the material in the book is required for success.** Therefore, there are weekly 10-minute quizzes on Moodle. Quizzes will not require any proof-writing; instead they will require you to demonstrate knowledge of definitions and theorems. You may be asked to provide specific statements and will be evaluated based on correct and precise wording. Although the quizzes are open notes/open book,

your success in the course is closely linked to your familiarity with the terminology—heavy dependence during the quizzes on notes/books is discouraged. The quizzes open on Monday at noon and close on Friday at 5pm.

Homework. Homework assignments will be challenging and lengthy. You should begin working on them as soon as possible; asking questions on the day the homework is due reflects poorly upon you. All homework assignments are posted on Moodle and are due by the start of class on the listed day, submitted online. You may turn in homework early.

Homework must be submitted online as a PDF via the link posted on Moodle. You may typeset your homework in $\text{\LaTeX}$ (and submit the PDF, not the tex file) or scan your homework and turn it into a PDF.

You may work on homework with other students; however, you are responsible for understanding all of the material covered in class or assigned as homework. Therefore, you should make sure that you have thought about and written a solution to each homework problem *as an individual*.

The best way to succeed in this course is to do as many problems as you possibly can to build up speed, confidence and understanding. Doing only homework exercises is considered a bare minimum effort. Moreover, a perfect score on a homework assignment is only awarded if the student demonstrates a high level of mastery of the material with correct and well-written solutions.

For those of you who are interested in typesetting your homework in $\text{\LaTeX}$, see the guide posted on Moodle.

Note: Microsoft Word is not a good typesetting program for mathematics.

Homework schedule. Writing advanced calculus proofs is challenging for students and takes a lot of time and energy. Therefore, the first two homeworks have staggered due dates to help you learn to manage your time wisely.

Homework Set	Due Date	Homework Set	Due Date
HW 1, Part 1	8/18	HW 5	10/9
Part 2	8/23	HW 6	10/20
Part 3	8/25	HW 7	10/27
HW 2, Part 1	9/1	HW 8	11/6
Part 2	9/8	HW 9	11/17
HW 3	9/18	HW 10	11/29
HW 4	9/29		

These due dates are subject to change.

Class expectations. Some of the homework problems are well-known problems whose solutions may be found online. **Searching for answers online is a bad habit to develop and a hard habit to break, and will not prepare you adequately for the exams.** If the instructor determines that a

solution resembles an online solution, the student will receive no credit for that problem. *Repeat offenses may incur stronger penalties.*

You are not allowed to use a laptop in class unless indicated otherwise. Any student using a smartphone, iPod, or other device irrelevant to class will be asked to put it away or leave. During tests, cell phones must off and out of sight.

1.8 Weekly course schedule

Week of	Topics	Remarks
8/16–8/18	Introduction, Chapter 1	No class 9/4 (Labor Day)
8/21–8/25	Chapter 2	
8/28–9/1	Chapter 2, Chapter 3	
9/4–9/8	Chapter 3	
9/11–9/15	Chapter 3, Chapter 11	
9/18–9/22	Chapter 11	Midterm 1 (Ch. 1–3 & 11 on 10/2)
9/25–9/29	Chapter 4, Review	
10/2–10/6	Chapter 5	
10/9–10/13	Chapter 5, Chapter 6	No class 10/5–10/6 (Fall Break) <i>Drop deadline is 10/13</i>
10/16–10/20	Chapter 6, Chapter 8	Midterm 2 (Ch. 4-6, beg. of 8 on 10/30)
10/23–10/27	Chapter 8, Review	
10/30–11/3	Chapter 9	
11/6–11/10	Chapter 9, Chapter 7	Midterm 3 (Ch. 7–9) on 11/20
11/13–11/17	Chapter 7, Review	
11/20–11/24	(Only class on Monday is the midterm)	No class 11/22–11/24 (Thanksgiving)
11/27–12/1	Chapter 10 (brief), Review	Last day of class is 12/1
12/11, 8AM–11AM	Final Exam	Daniels Hall 214

1.9 Statement on transportation

Not applicable.

1.10 Statement on safety and risk assumption

Not applicable.

1.11 How grades are determined

Your course grade will be determined out of 700 possible points:

Homework	20%
Quizzes	5%
Midterm 1	15%
Midterm 2	15%
Midterm 3	15%
Cumulative Final	30%

Attendance is taken but does not directly factor into your course grade. However, if you have **fewer** than 5 total absences, the final exam can replace your lowest midterm score. *This policy is strict—regardless of circumstances, if you miss more than 4 classes you are losing out on valuable classroom time.*

Your grades will be posted on Moodle. The final grade will be assigned using the plus/minus grading system according to the following chart:

A+ : 98–100	A : 93–97.99	A– : 90–92.99
B+ : 88–100	B : 83–87.99	B– : 80–82.99
C+ : 78–100	C : 73–77.99	C– : 70–72.99
D+ : 68–100	D : 63–67.99	D– : 60–62.99
	F : 0–59.99	

For example, a score of 87.56 is a B, not a B+.

1.12 Late Assignments

Late assignments must be submitted within two class meetings. For example if homework is collected on Friday, then a late homework must be submitted by the following Wednesday. Late homework must be accompanied by a documented and accepted excuse, else it is evaluated for half credit only.

1.13 Attendance/Absence Policy

Attendance is taken but does not directly factor into your course grade; see §1.11. If a midterm is missed due to documented and accepted circumstances, the midterm may be made up within one week of the student's return to class.

Note: Excuses for unanticipated absences must be reported to the instructor no more than one week after the return to class.

1.14 Academic Integrity

For the NCSU policy, see the Code of Student Conduct at policies.ncsu.edu/policy/pol-11-35-01.

Quizzes, Exams & Final: Students will neither give nor receive any assistance on any quiz, mid-term, or the final exam. Use of cell phones and calculators during exams is not permitted.

Homework: You are expected to work together on the homework; however, each student should turn in his or her own written homework. If you consult with other students, include the names of the people you consulted with. This includes people you give help to and people that you receive help from.

Utilization of the Honor Pledge: All exams and tests must be completed independent of assistance from other people. Implicit in any submission is the pledge that “I have neither given nor received unauthorized aid on this test or assignment.”

Penalty for violations: Any violation of this policy will be reported to the Office of Student Conduct with a recommendation of a failing grade for the assignment and/or course.

1.15 Non-discrimination Policy

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at <http://policies.ncsu.edu/policy/pol-04-25-05> or http://www.ncsu.edu/equal_op/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

1.16 Statement for students with disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Services Office at Suite 2221, Student Health Center, Campus Box 7509, 919-515-7653. For more information on NC States policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (REG02.20.01) (<https://policies.ncsu.edu/regulation/reg-02-20-01/>).

1.17 Electronic Course Components

Please be advised this course may be recorded for current and potential future educational purposes. By your continued participation in this recorded course, you are providing your permission to be recorded.

The course site for the class is Moodle. Instructor is not responsible for ensuring privacy or accessibility of electronic materials that are not required components of the course (e.g., links to supplemental information that is not part of the required reading list).

Required statement: “Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student course-work. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.”

1.18

Students are responsible for reviewing the NC State University PRRs which pertains to their course rights and responsibilities:

- Equal Opportunity and Non-Discrimination Policy Statement

<https://policies.ncsu.edu/policy/pol-04-25-05>

with additional references at <https://oied.ncsu.edu/equity/policies/>
- Code of Student Conduct <https://policies.ncsu.edu/policy/pol-11-35-01>
- Grades and Grade Point Average <https://policies.ncsu.edu/regulation/reg-02-50-03>
- Credit-Only Courses <https://policies.ncsu.edu/regulation/reg-02-20-15>
- Audits <https://policies.ncsu.edu/regulation/reg-02-20-04>