

# Syllabus—Math 402/502, Spring 2020

## Advanced Calculus II

INSTRUCTOR: Matthew Blair

EMAIL: [blair@math.unm.edu](mailto:blair@math.unm.edu)

OFFICE: SMLC 330

MEETING TIMES/LOCATION: Tuesdays and Thursdays 11am-12:15pm in SMLC 352.

COURSE WEBSITE: [www.math.unm.edu/~blair/math402s20.html](http://www.math.unm.edu/~blair/math402s20.html)

OFFICE HOURS: 2-3:30pm Tuesdays and Wednesdays. Also by appointment.

PREREQUISITES: MATH 401/501.

COURSE CREDITS: 3 credit hours.

TEXT: *An Introduction to Analysis*, Fourth Edition, by William R. Wade, published by Pearson.

### Course Description

Continuation of Math 401/501. The course will begin with a review of the completeness axiom of  $\mathbb{R}$  (§1.3) and uniform continuity (§3.4). The rest will cover the following chapters in the text: Integrability on  $\mathbb{R}$  (Ch. 5), Infinite series of functions (Ch. 7), Metric spaces (Ch. 10), Differentiability on  $\mathbb{R}^n$  (Ch. 11). Prior to Ch. 7, there will be a rapid review of numerical series in Ch. 6. Students are expected to review limits at infinity (§3.2) and the content of §8.1,8.2 on their own.

### Grading Scheme

Homework: 30%. 3 exams, weighted equally: 70%. Requests to change grading modes to Audit or Credit/No-Credit will be considered, but they should be fully processed before May 7, 2020.

### Exams

There will be in-class midterms on Thursday, March 5, and Thursday, April 16. The third exam will be during the final exam period on Tuesday, May 12, 12:30-2:30pm, in the usual classroom. The last exam will not be comprehensive. Information regarding the content of the exams will be provided in class as the time approaches. If you must miss an exam for a **valid** and **documented** reason such as illness, family emergency, active participation in scholarly or athletic activities, then you should notify the instructor as soon as possible. Otherwise, registration for the course constitutes an agreement that you will make every possible effort to be present for the exams.

### Homework

Homework will be assigned on a weekly basis, typically collected on Thursdays, with possible exceptions on exam weeks. Assignments will be handed out in class and posted on the course website. Other important considerations and policies for homework are below.

- **If you are stuck on a problem, get help in office hours.** This is what office hours are for! Be prepared to have a discussion concerning the progress you have made on the problem. Reliance on combing through textbooks and searching the internet for solutions will only hinder your understanding of the material and your problem solving skills.
- **Each assignment must be written up on your own and in your own words.** You

may discuss homework problems with others, but your own understanding of the solution must be evident in your written work. **Assignments that are unoriginal will not go unnoticed.** No collaboration is permitted on the exams.

- **Policy on responsible internet use.** You may use the internet as well as other texts to supplement your reading and enhance your understanding of the material. **However, you may not consult solutions written by others for the purpose of preparing a graded homework set.** This includes solutions manuals for the text and solutions found or solicited on internet forums. Such practices will be treated as a violation of the student code of conduct and is counterproductive towards your learning.
- **Mostly limit yourself to theorems and definitions from the textbook and class.** Much of the homework is designed to see what can be solved using only the basic principles introduced to that point. Overreliance on theorems from outside these two resources defeats this purpose and does not reflect your comprehension.
- **Late homework is not accepted.** Assignments should be submitted *during class time* on the due date. The 2 lowest homework scores will be dropped at the end of the semester.
- **Presentation matters.** Your homework will be graded on the clarity and cogency of your mathematical reasoning. Take care to hand in a neat, legible assignment and staple the pages together in the upper left hand corner. The instructor does not supply a stapler for homework sets: students should present to the instructor a one sentence, signed statement acknowledging this on the second day of class. Provide enough room for comments and other marks in the margins. Assignments not in compliance are subject to point deductions.
- **Hand in a *hard copy* of the assignment at the beginning of class.** Electronically submitted work is not accepted unless prior arrangements are made with and agreed to by the instructor.
- **You are expected to read the textbook outside of class.** Reading sections in the book before they are discussed in class will help you to get the most out of class time and to stay on top of the material.
- **Don't neglect the "On your own" problems.** You will often be given homework problems which you are to do on your own, i.e. it will not be collected for a grade. These are typically assigned as problems of significance to think about without overloading an assignment with too many written problems.

## Attendance and participation

The student handbook states "students are expected to attend all meetings of the classes in which they are enrolled." Be ready to engage yourself each lecture. Absences should be rare and warranted. Attendance will be taken regularly in the first week at the very minimum. Students not meeting expectations on attendance will be dropped from the course. If circumstances are causing you to miss a substantial amount of class, you should contact the instructor as soon as possible.

You are expected to arrive to class on time, it will start promptly at 11am. Being punctual is important so that we may conduct important business at the start of each class period and so as not to disrupt the instructor or your classmates.

The use of phones, laptops, and tablets are limited to note taking: no extracurricular use is permitted during class time. If an emergency requires you to answer a call or text a message handle this outside of the classroom. Phones should be silenced during class time.

## **Email**

Important announcements may be communicated through email. It is your responsibility to ensure that you either check the email account on file with University regularly or have these messages forwarded to an account which you do check regularly.

Email is a good way to communicate with the instructor during the working day, but please do use good email etiquette, including the use of greetings and topical subject headings. These are important to organize messages and distinguish your message from spam. Given the sophistication of the subject, mathematical questions cannot always be answered over email, particularly if there are several questions or if the answer is involved. Please do not send photos taken by your phone.

## **Academic Integrity**

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

## **Title IX Statement**

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered “responsible employees” by the Department of Education (see [pg. 15 www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf](http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf)). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity ([oeo.unm.edu](http://oeo.unm.edu)). For more information on the campus policy regarding sexual misconduct, see: [policy.unm.edu/university-policies/2000/2740.html](http://policy.unm.edu/university-policies/2000/2740.html)

## **Accommodation Statement**

In accordance with University Policy 2310 and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructors attention, as he/she are not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Contact Accessibility Resource Center at 277-3506 for additional information.

## Weekly schedule

The schedule below is tentative and subject to change. Spring break is 3/16-3/20 and is not counted as a week here. Students are asked to review §8.1, 8.2 prior to our coverage of Chapter 10 (OYO=On your own).

| Week   | Sections   | Topics   | Notes                 |
|--------|------------|--|-----------------------|
| 1      | 1.3, 3.4   | Review: Completeness axiom, uniform continuity                             |                       |
| 2      | 5.1, 5.2   | The Riemann Integral, Riemann Sums   |                       |
| 3      | 5.2, 5.3   | Riemann Sums, Fundamental theorem of calculus                              |                       |
| 4      | Ch. 6      | Review: Series of real numbers   |                       |
| 5      | 7.1, 7.2   | Uniform convergence of sequences and series                                |                       |
| 6      | 7.2, 7.3   | Power series   |                       |
| 7      | 7.4        | Analytic functions   | Exam 3/5              |
| 8      | 10.1, 10.2 | Metric Spaces, Limits  | Review<br>8.1,8.2 OYO |
| 9      | 10.2, 10.3 | Interior, closure, and boundary  |                       |
| 10     | 10.4, 10.5 | Compact sets, connected sets,  |                       |
| 11     | 10.6, 11.1 | Continuous functions, Partial Derivatives                                  |                       |
| 12     | 11.2       | Differentiability in several variables                                     | Exam 4/16             |
| 13     | 11.3, 11.4 | Tangent planes, Chain Rule   |                       |
| 14,15  | 11.5, 11.6 | Taylor's formula, Inverse & implicit function theorems, catch up as needed |                       |
| Finals |            | 3rd exam given May 12, 12:30-2:30pm  |                       |