

Monteith 414

Tuesdays and Thursdays 2:00 - 3:15

This syllabus contains the policies and expectations that the instructor has established for this course. Please read the entire syllabus carefully before continuing in this course. These policies and expectations are intended to create a productive learning atmosphere for all students. Unless you are prepared to abide by these policies and expectations, you risk losing the opportunity to participate further in the course.

Instructor: Prof. Matthew Badger (matthew.badger@uconn.edu)

Office: Monteith 326

Office Hours: Mondays 1:30-2:30, Wednesdays 10:00-11:00

Course Description

The derivative and definite integral of the calculus of functions of a single variable generalize to operations on functions of several variables, often doing so in surprising and unexpected ways. In this course, we will rigorously develop differentiation and integration of functions in the plane (dimension $n = 2$), in space (dimension $n = 3$), and in higher dimensional Euclidean spaces \mathbb{R}^n . We will observe some phenomenon which behave independently of the underlying dimension and we will see other phenomenon which behave radically different depending on the dimension.

Topics to be covered (some as time permits):

- Differentiability, partial derivatives, C^1 and C^k functions, the inverse function theorem, the implicit function theorem, Lipschitz functions, Rademacher's theorem.
- Riemann integration on Euclidean domains, partitions of unity, Riemann integration on manifolds with boundary, differential forms, Stokes' theorem, harmonic functions.

Required Resources

- **Course Webpage:** <https://badger.math.uconn.edu/> → Link to Math 3151, Section 1
- **HuskyCT:** huskyct.uconn.edu — for class announcements and grade sheet
- **Textbook:** Munkres, James R. Analysis on manifolds. Addison-Wesley Publishing Company, Advanced Book Program, Redwood City, CA, 1991. xiv+366 pp. ISBN: 0-201-51035-9.

Graded Components

- **Exams:** There will be two midterm exams to be announced in class.
- **Portfolio:** In lieu of homework and a final exam, you will prepare a writing portfolio consisting of proofs illustrating essential concepts and techniques learned throughout the course. Portfolio problems will be assigned in stages throughout the course. Drafts will be collected, returned with feedback, and must be revised for the final portfolio. Details will be announced in class. The completed portfolio is due in class on the day of the last lecture.
- **Participation:** You will receive a participation grade based on several components, which may include in-class quizzes, in-class writing workshops, and in-class presentations.

The *final grade* for the class will be based on your course average (see below) and your progress in the course. Your *course average* will be determined by the following calculation:

- 40% Exams, 50% Portfolio (20% Drafts, 30% Revisions), 10% Participation

Disability Support Services

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Center for Students with Disability:

(<http://www.csd.uconn.edu/>).

They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Academic Integrity

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to

report any suspected instance of academic dishonesty to Community Standards. For more comprehensive information on academic integrity, please refer to the Undergraduate Academic Integrity Policy:

<http://community.uconn.edu/the-student-code-appendix-a/>.

Syllabus Revision

The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class and changes to this syllabus will be posted on the course website.