Advanced Calculus I: MATH 315 GMU

Spring 2022

Instructor:	Dr. Mahamadi Warma	**Time:**	MW 3:00 PM–4:15 PM
Email:	mwarma@gmu.edu	**Place:**	PETRSN 1113

Office Hours: MW 9:30 AM–11:00 AM or by appointment.

Office: Exploratory Hall, room 4461.

Phone: 703-993-1488

Textbook and material: We will cover portions of Chapters 1-6 in the following text book:

- W. R. Wade. An introduction to Analysis. Fourth Edition. Publisher: Pearson Education.

Justification: This is the first course which introduces students to rigorous proofs in analysis. As such, theorems of elementary calculus of one variable are carefully proved and at the same time, the rudiments of general topology are introduced. Elementary calculus of one variable (limits, differentiation and integration) is thoroughly reviewed.

Objectives: At the end of the course, the students should be familiar with the use of sequences. The concept of limit is central to the course. The interplay between limits of functions and sequences should be stressed. However, the students will also be able to use basic concepts of open and closed subsets of $\mathbb{R}$ (having in mind the concepts of calculus in two or three dimensions). The notion of integrability of a function (Riemann integral) will be presented. The students should be able to distinguish between continuity and uniform continuity, and the uses of the mean value theorem.

Course Description: Introduction to proofs: logic, elementary set theory, cardinality. The real number system: the least upper bound axiom. Sequences of real numbers: monotone sequences, Cauchy sequences. Elementary topology of $\mathbb{R}$: the Bolzano-Weierstrass and Heine-Borel theorems. Continuity and uniform continuity. Differentiability of real functions, the mean value theorem. The Riemann integral. Series of real numbers.

Prerequisites: (MATH 213 or 215) and (MATH 300 or 290).

Homework: Problems will be assigned regularly throughout the semester. Students are expected to solve all the assigned problems, and some of these problems will be handed in and graded. Students are allowed to discuss assigned problems with classmates, but solutions should be written individually.

Tests: There will be one midterm and one final exam. All tests are closed-book and closed-notes.

Grading Policy: The midterm test counts for 30%, the graded homework and class participation for 30%, and the final exam for 40%. Equivalence between scores and letters, recommended by GMU, is given in the table below:

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>97	>93	>90	>87	>83	>80	>77	>73	>70	>60	60-0

Attendance and Course Policy: Students are expected to come to class regularly. In the event that you must miss class, you are responsible to ask classmates concerning announcements made in class and the material discussed.

Makeup exams are only possible with an acceptable excuse. Examples of such excuses are religious holy days, family emergencies, school sponsored events, job interviews, or sickness. All absences require documentation. Notify me of any religious holy days within the first 2 weeks of the semester. Changing the

date of the final exam for unusual circumstances, or because three or more finals are scheduled in one day, requires the approval from the professor at least a week prior to the last day of classes. If absence from the final exam is unexcused, the grade for the course is F.

Cellular Phones in the Classroom: Students must turn off all cellular Phones and other communication devices when in the classroom. Emergency personnel should notify the professor at the beginning of the course and set phones to vibrate mode.

GMU Policies: The University Catalog, http://catalog.gmu.edu, is the central resource for university policies in university academic affairs. Further policies are available at http://universitypolicy.gmu.edu/. All members of the university community are responsible for knowing and following established policies.

Honor code: Students are expected to follow the honor code https://oai.gmu.edu/mason-honor-code/. Lack of knowledge of the honor code is not a reasonable excuse for its violation.

Disability Services: Reasonable accommodations are available for students who have a documented disability. Please contact Disability Services if you require accommodations: Office of Disability Services, Student Union Building I (SUB I), Room 4205, Phone: 703-993-2474.