Introduction to Advanced Mathematics: MATH 290 GMU

Fall 2020

Instructor:	Dr. Mahamadi Warma	**Time:**	MW 1:30 PM–2:45 PM
Email:	mwarma@gmu.edu	**Place:**	R B360

Office Hours: MW 10:00 AM–11:30 AM or by appointment.

Office: Exploratory Hall, room 4461.

Phone:

Textbook and material: We will cover portions of Chapters 1-5 in the following text book:

- D. Smith, M. Eggen and R. St. Andre. A Transition to Advanced Mathematics (eighth edition).

Justification: The main goal of this course is to teach the students how to write, read, and recognize correct mathematical proofs. The students will be introduced to some elementary concepts of advanced mathematics including elementary propositional logic, set theory, relations, functions, and cardinality.

Objectives: At the end of the course, the students should be familiar with the basic concepts of set theory, cardinality, mathematical logic, functions and relations and the use of the principle of mathematical induction. They should also be able to formulate properly definitions, conjectures and know proof strategies based on evidence gathered from examples, and special cases. These basic skills are important to understand the motivations and techniques of mathematical research.

Course Description: Logic and proofs: propositions and connectives, conditionals and biconditionals, quantified statements, basic proof methods, strategies for constructing proofs, proofs from number theory. Sets and induction: basic concepts of set theory, set operations, mathematical induction, principles of counting. Relations and partitions. Functions: functions and relations, functions that are onto, one-to-one functions, inverse functions, limits and continuity of real functions. Cardinality: equivalent sets, finite sets, infinite sets, countable sets, the ordering of cardinal numbers.

Prerequisites: (MATH 114^{C}, 114T or 116^{C}). ^{C} *means: Requires minimum grade of C.*

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. Much emphasis will be laid on correct grammar, good organization and clarity of expression as well as correct logic in all graded work.

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

Grading Policy: The midterm counts for 25%, the graded homework and class participation for 40%, and the final exam for 35%. 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.