Course Title: MAT 320 Foundations of Mathematics
Term: Fall 2022
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

Topics symbolic logic, set theory, functions, and number systems will be discussed with focusing on techniques of proof and mathematical writing. This course contains an assessment that must be successfully completed in order to register for student teaching. This course will permit students to build upon and share knowledge already acquired while pointing out areas in which additional study may be needed. In addition, it will develop the communication skills and understanding of the process of doing mathematics necessary for further study.

Course Prerequisites:

MAT 137 Calculus II

MAT 226 Discrete Mathematics

Learning Outcomes:

By the end of the course, the student should be able to:

A. Write mathematics and proofs in a clear, concise, logical, and correct way;

B. Understand the rules of formal logic and be able to use these rules to read and write mathematical arguments;

C. Obtain a good understanding of relations, especially equivalence relations and their applications to partitions of sets;

D. Have a working knowledge of many of the types of relation that are fundamental to mathematics.

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Course Material:

Daniel J. Velleman, ***How to Prove It: A Structured Approach***, 3th, Cambridge University Press, 2019.

Evaluation:

- Homework [40%]
- Mid-term Exam [25%]
- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

Week 1	
1	Sentential Logic
2	Deductive Reasoning and Logical Connectives
3	Truth Tables
4	The Conditional and Biconditional Connectives
5	Quantificational Logic **Homework#1**

Week 2	
6	Equivalence Involving Quantifiers
7	Proofs
8	Proof Strategies
9	Proves Involving Negations and Conditionals
10	Proofs Involving Quantifiers **Homework#2**
Week 3	
11	Relations
12	Ordered Pairs and Cartesian Products
13	**Mid-term Exam**
14	Ordering Relations
15	Closures **Homework#3**
Week 4	
16	Functions
17	One-to-one and Onto
18	Inverses of Functions
19	Mathematical Induction
20	More Examples of Functions **Homework#4**
Week 5	
21	Infinite Sets
22	Equinumerous Sets
23	Countable and Uncountable Sets
24	The Cantor-Schröder-Bernstein Theorem
25	**Final Exam**