Course Description
An introduction to a wide variety of mathematical ideas and techniques that do not involve calculus. Topics include proof, logic, mathematical induction, set theory, elementary number theory, equivalence relations, functions, cardinality, combinatorics, and graph theory.

Prerequisite
MATH 133 (Calculus I).

Textbook (required)
Mathematical Reasoning: Writing and Proof (version 2.1), Ted Sundstrom, Creative Commons, November 4, 2019, 592 pp. Available at: https://scholarworks.gvsu.edu/books/

Grading
Grades will be given based on the following scale and your overall percentage in the course.

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<thead>
<tr>
<th>Letter</th>
<th>Point</th>
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<tbody>
<tr>
<td>A</td>
<td>4.00</td>
<td>[93,100]</td>
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<tr>
<td>A-</td>
<td>3.67</td>
<td>[90,93)</td>
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<tr>
<td>B+</td>
<td>3.33</td>
<td>[87,90)</td>
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<tr>
<td>B</td>
<td>3.00</td>
<td>[83,87)</td>
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<tr>
<td>B-</td>
<td>2.67</td>
<td>[80,83)</td>
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<tr>
<td>C+</td>
<td>2.33</td>
<td>[77,80)</td>
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<tr>
<td>C</td>
<td>2.00</td>
<td>[73,77)</td>
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<tr>
<td>C-</td>
<td>1.67</td>
<td>[70,73)</td>
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<tr>
<td>D</td>
<td>1.0</td>
<td>[60,70)</td>
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<td>F</td>
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<td>W</td>
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QFR (Quantitative and Formal Reasoning) credit and Pass/No Pass: to earn QFR credit one must pass the course. If the course is taken for a grade, then ≥D is considered passing. If the course is taken Pass/No Pass, then ≥C- is considered passing and is given the grade Pass (P); work <C- is considered not passing and is given the grade No Pass (NP).

50% Homework
Homework will be assigned weekly on Blackboard. Homework must be written up **neatly with multiple pages stapled**, otherwise it will not be graded. Students are encouraged to work together to learn the material, but each student must independently write up their own solutions. Homework is a major part of the course. The lowest score is dropped. No late homework will be accepted.

25% Midterm Exam
Wednesday, March 18, in class. No electronic devices, notes, or books are allowed on exams.

25% Final Exam
Thursday, May 14, 9–11 a.m. No electronic devices, notes, or books are allowed on exams.

Disabilities
The college will make reasonable accommodations for persons with documented disabilities. Students should notify the Office of Disability Services located in Peters G-27/G-28 and their instructor of any disability related needs within the first two weeks of class.
Honor Code
The College requires that students sign an Honor Code for all assignments. This pledge (which is written out on each assignment) states: “I affirm that I have adhered to the Honor Code in this assignment.” For further information, see: https://www.oberlin.edu/dean-of-students/student-conduct/academic-integrity.

Cell Phones
The use of cell phones, smart phones, and other mobile communication devices is disruptive and is therefore prohibited during class. Except in emergencies, those using such devices are kindly asked to leave the classroom.

Important Dates
- First day of classes: Monday, February 3.
- Add/drop deadline: Wednesday, February 12.
- Midterm Exam: Wednesday, March 18, in class.
- Spring recess: Saturday, March 21 – Sunday, March 29.
- Midterm grades available via Banner: Thursday, April 2.
- Last day to declare P/NP or to withdraw: Monday, April 6.
- Last day of classes: Friday, May 8.
- Final Exam: Thursday, May 14, 9–11 a.m.

Learning Goals
By the end of this course, students will be able to:

- Use logical reasoning to solve counting problems, puzzles, and various other theoretical and applied mathematical problems.
- Understand the concept of ‘proof’, develop an eye for a correct proof, and write proofs.
- Understand the principle of induction and be able to apply it in proofs. This involves recognizing patterns.
- Use the basic language and symbols of set theory.
- Comfortably use functions, compose them, and utilize properties of their inverses (when they exist).
- Understand the crucial concept of an equivalence relation. This includes key examples of such relations.
- Understand and apply some elementary number theory.
- Compare the sizes of various infinite sets.
- Prove some basic properties of trees and other graphs.