# Schedule

A week-by-week breakdown of the material.

## Week 1

### Monday

- Introduction
- Writing Mathematics[1]
- Sets, set notation[2]
- Subsets[3]
- Set Operations[4]
- Quiz 0[5] (Due Monday night together with Quiz 1)
- Homework 1 due Tuesday[6]
- Prepare for class presentation:
  - Exercises 1.9, 1.19, 1.34

### Tuesday

- Indexed Collections of sets[7]
- Set Partitions[8]
- Cartesian Products[9]
- Quiz 1[10] (Due Monday night together with Quiz 2)
- Homework 2 due Wednesday[11]
- Prepare for class presentation:
  - Exercises 1.41, 1.54

### Wednesday

- Statements[12]
- Negations[13]

[1] notes/writing.html
[2] notes/sets_notation.html
[3] notes/subsets.html
[4] notes/set_operations.html
[5] https://moodle.hanover.edu/mod/quiz/view.php?id=19351
[6] assignments/hw1.html
[7] notes/indexed_collections.html
[8] notes/sets_partitions.html
[9] notes/cartesian_products.html
[10] https://moodle.hanover.edu/mod/quiz/view.php?id=19389
[11] assignments/hw2.html
[12] notes/statements.html
[13] notes/negation.html

- Disjunction and Conjunction[14]
- Implications[15]
- Quiz 2[16] (Due Tuesday night)
- Homework 3 due Thursday[17]
- Prepare for class presentation:
  - Exercises 2.18, 2.29, 2.32

### Thursday

- Biconditional[18]
- Tautologies, Contradictions[19]
- Logical Equivalence[20]
- Fundamental properties of logical equivalence[21]
- Quiz 3[22] (Due Wednesday night)
- Homework 4 due Friday[23]
- Prepare for class presentation:
  - Exercises 2.39, 2.50, 2.53

### Friday

- Exam 1

## Week 2

### Monday

- Quantified Statements[24]
- Characterization[25]
- Quiz 4[26] (Due Sunday night)
- Homework 5 due Tuesday[27]

[14] notes/disjunction_conjunction.html
[15] notes/implications.html
[16] https://moodle.hanover.edu/mod/quiz/view.php?id=19403
[17] assignments/hw3.html
[18] notes/biconditional.html
[19] notes/tautologies_contradictions.html
[20] notes/logical_equivalence.html
[21] notes/logical_equiv_properties.html
[22] https://moodle.hanover.edu/mod/quiz/view.php?id=19429
[23] assignments/hw4.html
[24] notes/quantified_statements.html
[25] notes/characterization.html
[26] https://moodle.hanover.edu/mod/quiz/view.php?id=19644
[27] assignments/hw5.html

**Tuesday**

- Trivial and Vacuous Proofs[28]
- Direct Proofs[29]
- Proof by Contrapositive[30]
- Prepare for class presentation:
  - Exercises 3.10, 3.18
- Quiz 5[31] (Due Monday night)
- Homework 6 due Wednesday[32]

**Wednesday**

- Proof by cases[33]
- Direct and Contrapositive proofs for divisibility[34]
- Direct and Contrapositive proofs for congruence[35]
- Prepare for class presentation:
  - Exercises 3.28, 4.16
- Quiz 6[36] (Due Tuesday night)
- Homework 7 due Thursday[37]

**Thursday**

- Direct and Contrapositive proofs for real numbers[38]
- Proofs involving sets[39]
- Properties of set operations, cartesian products[40]
- Prepare for class presentation:
  - Exercises 4.34, 4.38, 4.44, 4.58, 4.62, 4.64
- Quiz 7[41] (Due Wednesday night)
- Homework 8 due Friday[42]

[28] notes/trivial_vacuous_proofs.html
[29] notes/direct_proofs.html
[30] notes/contrapositive.html
[31] https://moodle.hanover.edu/mod/quiz/view.php?id=19782
[32] assignments/hw6.html
[33] notes/proofs_cases.html
[34] notes/proofs_divisibility.html
[35] notes/proofs_congruence.html
[36] https://moodle.hanover.edu/mod/quiz/view.php?id=19786
[37] assignments/hw7.html
[38] notes/proofs_reals.html
[39] notes/proofs_sets.html
[40] notes/set_properties.html
[41] https://moodle.hanover.edu/mod/quiz/view.php?id=19787
[42] assignments/hw8.html

### Friday

- Catching up
- Exam 2

## Week 3

### Monday

- Proofs by counterexample[43]
- Proofs by contradiction[44]
- Existence proofs[45]
- Prepare for class presentation:
  - Exercises 5.6, 5.18
- Quiz 8[46] (Due Sunday night)
- Homework 9 due Tuesday[47]

### Tuesday

- Principle of Mathematical Induction[48]
- General Principle of Mathematical Induction[49]
- Proofs by Minimum Counterexample[50]
- Prepare for class presentation:
  - Exercises 6.8, 6.18
- Quiz 9[51] (Due Monday night)
- Homework 10 due Wednesday[52]

### Wednesday

- Strong Principle of Mathematical Induction[53]
- Testing Statements[54]

[43] notes/proofs_counterexample.html
[44] notes/proofs_contradiction.html
[45] notes/proofs_existence.html
[46] https://moodle.hanover.edu/mod/quiz/view.php?id=19997
[47] assignments/hw9.html
[48] notes/mathematical_induction.html
[49] notes/general_induction.html
[50] notes/proofs_minimum_counterexample.html
[51] https://moodle.hanover.edu/mod/quiz/view.php?id=20014
[52] assignments/hw10.html
[53] notes/strong_induction.html
[54] notes/testing_statements.html

- Introduction to Relations[55]
- Prepare for class presentation:
  - Exercises 6.44, 7.33, 7.50, 7.68, 8.4
- Quiz 10[56] (Due Tuesday night)
- Homework 11 due Thursday[57]

### Thursday

- Review/Catchup

### Friday

- Catchup
- Exam 3

## Week 4

### Monday

- Properties of Relations[58]
- Equivalence Relations[59]
- Prepare for class presentation:
  - Exercises 8.14, 8.18, 8.28, 8.29
- Quiz 11[60] (Due Sunday night)
- Homework 12 due Tuesday[61]

### Tuesday

- Equivalence Classes
- Congruences as an equivalence
- Arithmetic on Integers modulo n
- Quiz 12 (Due Monday night)

[55] notes/relations_intro.html
[56] https://moodle.hanover.edu/mod/quiz/view.php?id=20039
[57] assignments/hw11.html
[58] notes/relations_properties.html
[59] notes/relations_equivalence.html
[60] https://moodle.hanover.edu/mod/quiz/view.php?id=20078
[61] assignments/hw12.html

**Wednesday**

- Definition of functions
- One-to-one and onto functions
- Bijective functions, Inverse function
- Quiz 13 (Due Tuesday night)

**Thursday**

- Image and inverse image of sets under functions/relations. Properties
- Quiz 14 (Due Wednesday night)

**Friday**

- Wrap-up
- Exam 4