# MA 1025 — Introduction to Mathematical Reasoning (4-0)

**Prerequisite:** None.

**Text: Discrete Mathematics (Brief Edition), S.S. Epp, Brooks/Cole 2011, ISBN 0-495-82617-0**

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| HOURS | TOPIC | SECTION |
| 1-1 | Mathematical Language: Variables, Sets, Relations | 1.1—1.3 |
| 2-3 | Propositions, Connectives, Equivalence | 2.1 |
| 2-5 | Conditional Statements, Valid Arguments | 2.2, 2.3 |
| 2-7 | Predicates and Quantifiers | 3.2 |
| 1-8 | Nested Quantifiers | 3.3 |
| 1-9 | Inference Rules and Deduction | 3.4 |
| 2-11 | Proofs in Mathematics: Direct Proof of Conditionals | 4.1—4.3 |
| 1-12 | Proofs in Mathematics: Proof by Cases | 4.4 |
| 2-14 | Indirect Proof – Contraposition and Contradiction | 4.5, 4.6 |
| 1-15 | Sequences and Summation | 5.1 |
| 3-18 | Mathematical Induction | 5.2, 5.3 |
| 1-19 | Naïve Set Theory (Introduction, element-chasing) | 6.1 |
| 1-20 | Properties of Sets | 6.2 |
| 1-21 | Disproof, Algebraic Proof | 6.3 |
| 1-22 | Functions on General Sets | 7.1 |
| 2-24 | Surjections, Injections, Bijections | 7.2 |
| 1-25 | Composition of Functions | 7.3 |
| 1-26 | Cardinality and Countability | 7.4 |
| 1-27 | Relations (Introduction) | 8.1 |
| 2-29 | Properties of Relations | 8.2 |
| 1-30 | Equivalence Relations | 8.3 |
| 1-31 | Elementary Counting (Introduction) | 9.1 |
| 2-33 | Multiplication and Addition Rules | 9.2-9.3 |
| 1-34 | The Pigeonhole Principle | 9.4 |
| 2-36 | Counting: Combinations , Permutations w/Repetition | 9.5 |
| 2-38 | Combinatorial Reasoning, the Binomial Theorem | 9.6 |
| 4-42 | Exams, Reviews, and Holidays |  |

C. Rasmussen, 8/4/2011