

640:106: Introduction to Math Thought

Textbook: Contemporary Mathematics, Openstax, Kirk
(<https://openstax.org/details/books/contemporary-mathematics>)

Prerequisites:None

Credits:3

Course Outline:

This course introduces students to a broad variety of real world applications of mathematics and statistics in the social sciences, art, and other areas of study. It is intended for students in programs which do not require any further courses in mathematics. The course along with 640:103 can be taken in any order to fulfill both 640 and LQR general education requirements. Topics covered include: sets, logic, modular arithmetic, numeration systems, and probability.

Sections Covered:

- 1.1: Basic Set Concepts
- 1.2: Subsets
- 1.3: Understanding Venn Diagrams
- 1.4: Set Operations with Two Sets
- 1.5: Set Operations with Three Sets
- 2.1: Statements and Quantifiers
- 2.2: Compound Statements
- 2.3: Constructing Truth Tables
- 2.4: Truth Tables for the Conditional and Biconditional
- 2.5: Equivalent Statements
- 2.6: DeMorgan's Laws
- 2.7: Logical Arguments
- 3.7: Clock Arithmetic
- 4.1: Hindu-Arabic Positional System
- 4.2: Early Numeration Systems
- 4.3: Converting with Base Systems
- 4.4: Addition and Subtraction in Base Systems
- 4.5: Multiplication and Division in Base Systems
- 7.1: The Multiplication Rule for Counting
- 7.2; Permutations
- 7.3: Combinations
- 7.4: Tree Diagrams, Tables, and Outcomes
- 7.5: Basic Concepts of Probability
- 7.6: Probability with Permutations and Combinations

7.7: What Are the Odds?

7.8: The Addition Rule for Probability

7.9: Conditional Probability and the Multiplication Rule

7.10: The Binomial Distribution

7.11: Expected Value