Course Outline

Department of Mathematics and Statistics

Minnesota State University, Mankato

Math 290 Foundations of Mathematics (4 semester hours)

Course Description:
Logic, proof techniques, set theory, relations, functions, cardinality, operations, and an introduction to mathematical structures and number theory.

Prerequisites: MATH 122 with “C” (2.0) or better or consent.

Learning Outcomes:

Students will be able to

1. Identify and construct valid arguments
2. Discover the nature and structure of mathematics
3. Apply definitions and make inferences
4. Express ideas mathematically

Content Outline:

1. Propositional logic
2. First order logic
3. Mathematical induction
4. Techniques of proof
5. Relations, functions and their inverses
6. Naïve set theory
7. Cardinal numbers
8. Cardinal arithmetic
9. Historical challenges in set theory
10. Applications to number theory

Textbook/Related Readings/Materials:

Paul Halmos, Naïve Set Theory, Springer
Thomas Sibley, Foundations of Set Theory, Wiley
Peter J. Eccles, An Introduction to Mathematical Reasoning, Cambridge University Press