

Tennessee Technological University
Mathematics Department

MATH 3400: Introduction to Concepts of Mathematics

I. COURSE DESCRIPTION FROM CATALOG:

A rigorous treatment of elements of logic and set theory including propositional calculus (statements, connectives, conditionals, negation), quantifiers, sets and operations on sets, mappings, equivalence relations, mathematical induction. Students are expected to work in an abstract setting using precise definitions and formal proofs. Lec. 2 Rec. 2. Cr. 3.

II. PREREQUISITE(S):

C or better in MATH 1920

III. COURSE OBJECTIVE(S):

To learn to prove theorems, to write proofs up in good style, and generally to understand and appreciate the role of inductive reasoning, deductive reasoning, and proof in mathematics.

IV. STUDENT LEARNING OUTCOMES:

Upon successful completion of the course students will be able to create and write up simple proofs in good style that illustrate the techniques of direct proof, contrapositive, contradiction, cases, and induction, while developing a working knowledge of basic set theory, basic logic, and basic function theory needed for success in upper-division mathematics courses.

V. TOPICS TO BE COVERED:

Truth tables, propositional calculus, quantifiers, predicate calculus, methods of proof, proving theorems, sets, mathematical induction, relations, equivalence relations, one-to-one and onto functions, images and inverse images of sets and composition of functions.

VI. ADDITIONAL INFORMATION:

Lecture and recitation

VII. POSSIBLE TEXTS AND REFERENCES:

Mathematical Proofs, 4th ed. by Chartrand

The Structure of Proof with Logic and Set Theory, Michael O'Leary, Prentice Hall, 1st edition, 2002.

A Transition to Advanced Mathematics by Smith, Eggin & St. Andre, 5th edition

A Primer of Abstract Mathematics by Robert Ash

Conjecture and Proof by Miklos Laczkovich

Foundations of Abstract Mathematics by Kurtz

An Introduction to Abstract Mathematics by Bond and Keane

Proofs & Fundamentals by Bloch

Nuts & Bolts of Proofs by Cupillari

VIII. ANY TECHNOLOGY THAT MAY BE USED:

IX. STUDENT ACADEMIC MISCONDUCT POLICY:

Maintaining high standards of academic integrity in every class at Tennessee Tech is critical to the reputation of Tennessee Tech, its students, alumni, and the employers of Tennessee Tech graduates. The Student Academic Misconduct Policy describes the definitions of academic misconduct and policies and procedures for addressing Academic Misconduct at Tennessee Tech. For details, view the Tennessee Tech's Policy 217 – Student Academic Misconduct at [Policy Central](#).

X. DISABILITY ACCOMMODATION:

Students with a disability requiring accommodations should contact the Office of Disability Services (ODS). An Accommodation Request (AR) should be completed as soon as possible, preferably by the end of the first week of the course. The ODS is located in the Roaden University Center, Room 112; phone 372-6119. For details, view the Tennessee Tech's Policy 340 – Services for Students with Disabilities at [Policy Central](#).