

SOUTHEASTERN LOUISIANA UNIVERSITY
DEPARTMENT OF MATHEMATICS
MATH 2230 COURSE INFORMATION
Effective Fall 2024

COURSE TITLE: Foundations of Discrete Mathematics

CREDIT: 3 semester hours

TEXT: *Mathematical Proofs: A Transition to Advanced Mathematics*, 3rd Ed.,
 by Chartrand, Polimen, and Zhang

PUBLISHER: Pearson

PREREQUISITE: MATH 2000

COURSE DESCRIPTION: This course is designed to introduce students to the techniques of writing mathematical proofs. Topics include logic, quantified statements, elementary number theory, sets, and functions and relations.

SPECIFIC COURSE OBJECTIVES – The section numbers in the textbook covering these topics are given after the topic:

MATH 2230 Objectives Student will be able to:	Section
Describe sets, determine whether an object is a member of a given set, and provide examples of sets	1.1
Determine whether a set is a subset of another given set, calculate power sets, and determine the cardinality of sets	1.2
Calculate unions, intersections, and complements of sets, and provide examples of sets with properties described in terms of these set operations	1.3
Determine generalized unions, intersections, and complements of an indexed collection of sets	1.4
Calculate partitions of a given set	1.5
Calculate the Cartesian product of sets	1.6
Determine if a sentence is a statement and determine the truth table for a given statement	2.1
Determine the negation of a statement	2.2
Calculate the truth table for the disjunction and conjunction of statements	2.3
Determine the truth table for an implication	2.4, 2.5
Determine the truth table for a biconditional	2.6
Determine if a compound statement is a tautology or a contradiction	2.7
Determine the logical equivalence of statements	2.8, 2.9
Determine whether given quantified statements are true or false, and write	2.10
Write logically correct direct proofs	3.2
Write logically correct proofs by proving the contrapositive	3.3
Write logically correct proofs by cases	3.4
Evaluate a given proof by determining what statement it proves.	3.5
Write logically correct proofs of statements on the divisibility of integers	4.1
Write logically correct proofs of statements on the congruence of integers	4.2
Write logically correct proofs of statements on properties of real numbers	4.3
Write logically correct proofs of involving sets	4.4
Prove fundamental properties of set operations and Cartesian products	4.5, 4.6
Use the method of contradiction to write proofs	5.2
Prove existence theorems	5.4
Prove statements using the Principle of Mathematical Induction	6.1, 6.2