# MATH 5161: QUALIFYING EXAM SYLLABUS

## AUGUST 2024 EXAM

## 1. Textbooks

(1) Syllabus textbook: *Elementary Number Theory* , Seventh Edition by David M. Burton
(2) Additional textbook: *An Introduction to Theory of Numbers*, Fifth Edition by Niven, Zuckerman, and Montgomery

## 2. Topics

- The level of problems for the Qualifying Exam is likely to be comparable to the exercises and examples in the textbook.
- Included Topics are
  - Divisibility theory in the integers: Division algorithm, Solving Diophantine equation, etc.
  - Distributions of Primes: Infinitude of primes in arithmetic progressions, The fundamental theorem of arithmetic, etc.
  - Theory of congruence: Basic properties of congruence, Linear congruence and Chinese remainder theorem, Fermat's theorem, Wilson's theorem, etc.
  - Number theoretic functions and basic properties
  - Euler Generalization of Fermat theorem
  - Primitive roots and properties
  - Quadratic reciprocity theorem