

MA 311 Introduction to Number theory

Syllabus*

Course Description An introduction to classical number theory with a balance between theory and computation. Topics include mathematical induction, divisibility properties, properties of prime numbers, the theory of congruences, number theoretic functions, continued fractions.

Prerequisites C or better in MA 126.

Textbook *Elementary Number Theory*, 7th edition, by David M. Burton. Published by McGraw Hill. ISBN #978-0-07-338314-9

Topics & Time Distribution

Coverage: Chapter 1	all sections	1.5 weeks
Chapter 2	all sections	2 weeks
Chapter 3	(omit 3.3)	1 week
Chapter 4	all sections	2 weeks
Chapter 5	(omit 5.4)	1.5 weeks
Chapter 6	(omit 6.3. and 6.4)	1.5 weeks
Chapter 7	all sections	2.5 weeks
Chapter 15	(omit 15.1 and 15.4)	2 weeks

Note - time allotments are approximate and do not include exams.

MA 311 Differential Equations Learning Objectives

- Understanding the principle of finite induction and to be able to write proofs by induction.
- The ability to write short proofs using techniques such as proof by contradiction and the contrapositive
- Understanding and executing the division algorithm and the Euclidean algorithm.
- Understanding the meaning of terms such as prime number, greatest common divisor and the ability to verify the equivalence of various definitions for these terms.
- Be able to solve Diophantine equations and linear congruences.
- Be able to use and justify divisibility properties.
- Familiarity with modular arithmetic.
- Understanding the theorems by Fermat, Wilson and Euler and their proofs.
- A basic understanding of number theoretic functions including Euler's Φ -function and the Mobius μ -function.
- Understanding and manipulating multiplicative functions.
- Understanding finite and infinite continued fractions.