

MA383: Introduction to Modern Algebra

Fall 2022 Itinerary

Wednesday, August 17 (Week 1)

Review of Set Operations and the Basics of Logic

Friday, August 19

The Principle of Mathematical Induction and the Division Algorithm

Quiz: Set Operations and the Basics of Logic

Monday, August 22 (Week 2)

The Integers Modulo n and Rigid Motions

Quiz: the Principle of Mathematical Induction and the Division Algorithm

Group Theory

Wednesday, August 24

Groups (Definitions and Examples)

Quiz: the Integers Modulo n and Rigid Motions

Friday, August 26

Groups (Basic Properties and Subgroups)

Quiz: Groups (Definitions and Examples)

Monday, August 29 (Week 3)

Cyclic Groups

Quiz: Groups (Basic Properties and Subgroups)

Wednesday, September 1

Complex Numbers as a Group Under Multiplication

Quiz: Cyclic Groups

Friday, September 2

The Symmetric Group on n Letters

Quiz: Complex Numbers as a Group Under Multiplication

Monday, September 5 (Week 4)

Labor Day

Wednesday, September 7

Dihedral Groups

Quiz: the Symmetric Group on n Letters

Friday, September 9

Cosets and Lagrange's Theorem

Quiz: Dihedral Groups

Monday, September 12 (Week 5)

Quotient Groups and Normal Subgroups

Quiz: Cosets and Lagrange's Theorem

Wednesday, September 14

Group Homomorphisms and Cayley's Theorem

Quiz: Quotient Groups and Normal Subgroups

Friday, September 16

The Group Isomorphism Theorems

Quiz: Group Homomorphisms and Cayley's Theorem

Monday, September 19 (Week 6)

External and Internal Direct Products

Quiz: the Group Isomorphism Theorems

Wednesday, September 21

Finite Abelian Groups

Quiz: External and Internal Direct Products

Friday, September 23

Finitely Generated Abelian Groups and the Smith Normal Form

Quiz: Finite Abelian Groups

Monday, September 26 (Week 7)

Group Actions and the Class Equation

Quiz: Finitely Generated Abelian Groups and the Smith Normal Form

Wednesday, September 28

Sylow's Theorems

Quiz: Group Actions and the Class Equation

Friday, September 30

Sylow's Theorems (Applications)

Quiz: Sylow's Theorems

Monday, October 3 (Week 8)

Exam I Review

Quiz: Sylow's Theorems (Applications)

Wednesday, October 5

Exam I

Friday, October 7

Fall Break

Ring Theory

Monday, October 10 (Week 9)

Rings, Ring Homomorphisms, Ideals, and Quotient Rings

Wednesday, October 12

The Ring Isomorphism Theorems

Quiz: Rings, Ring Homomorphisms, Ideals, and Quotient Rings

Friday, October 14

Integral Domains, Fields, and Prime and Maximal Ideals

Quiz: the Ring Isomorphism Theorems

Monday, October 17 (Week 10)

The Chinese Remainder Theorem

Quiz: Integral Domains, Fields, and Prime and Maximal Ideals

Wednesday, October 19

Extension, Contraction, and Oka Families

Quiz: [the Chinese Remainder Theorem](#)

Friday, October 21

Polynomial Rings and Polynomial Long Division

Quiz: [Extension, Contraction, and Oka Families](#)

Monday, October 24 (Week 11)

Irreducibility of Polynomials

Quiz: [Polynomial Rings and Polynomial Long Division](#)

Wednesday, October 26

Euclidean Domains

Quiz: [Irreducibility of Polynomials](#)

Friday, October 28

Principal Ideal Domains (PIDs)

Quiz: [Euclidean Domains](#)

Monday, October 31 (Week 12)

Unique Factorization Domains (UFDs)

Quiz: [Principal Ideal Domains \(PIDs\)](#)

Wednesday, November 2

Polynomial Rings over UFDs

Quiz: [Unique Factorization Domains \(UFDs\)](#)

Friday, November 4

Fields of Fractions and Localization

Quiz: [Polynomial Rings over UFDs](#)

Monday, November 7 (Week 13)

Exam II Review

Quiz: [Fields of Fractions and Localization](#)

Wednesday, November 9

Exam II

Field Theory

Friday, November 11

Roots of Polynomials and Field Extensions

Monday, November 14 (Week 14)

Finite Extensions

Quiz: Roots of Polynomials and Field Extensions

Wednesday, November 16

Splitting Fields of Polynomials and Algebraic Closure

Quiz: Finite Extensions

Friday, November 18

Finite Fields

Quiz: Splitting Fields of Polynomials and Algebraic Closure

Monday, November 21 (Week 15)

Separable Extensions

Quiz: Finite Fields

Wednesday, November 23

Thanksgiving Break

Friday, November 25

Thanksgiving Break

Monday, November 28 (Week 16)

Field Automorphisms

Quiz: Separable Extensions

Wednesday, November 30

The Galois Group

Quiz: Field Automorphisms

Friday, December 2

The Fundamental Theorem of Galois

Quiz: the Galois Group