MA281: Introduction to Linear Algebra

Fall 2022 Itinerary

Matrices and Vector Spaces

Wednesday, August 17 (Week 1)

Matrices and Matrix Addition

Friday, August 19

Rotation Matrices and Matrix Multiplication
Quiz: Matrices and Matrix Addition

Monday, August 22 (Week 2)

Elementary Row and Column Operations
Quiz: Rotation Matrices and Matrix Multiplication

Tuesday, August 23

Group Work: Matrix Operations

Wednesday, August 24

The Method of Gaussian Elimination in Linear Systems
Quiz: Elementary Row and Column Operations

Friday, August 26

Invertible Matrices
Quiz: the Method of Gaussian Elimination in Linear Systems

Monday, August 29 (Week 3)

Vector Spaces
Quiz: Invertible Matrices

Tuesday, August 30

Group Work: Gaussian Elimination and Matrix Inversion

Wednesday, September 1

Span and Linear Independence
Quiz: Vector Spaces

Friday, September 2

Vector Space Dimension
Quiz: Span and Linear Independence

Monday, September 5 (Week 4)

Labor Day

Tuesday, September 6

Group Work: Vector Spaces, Bases, and Dimension

Wednesday, September 7

Matrix Rank
Quiz: Vector Space Dimension

Friday, September 9

Linear Transformations
Quiz: Matrix Rank

Monday, September 12 (Week 5)

Kernels and Images of Linear Transformations
Quiz: Linear Transformations

Tuesday, September 13

Group Work: Rank and Nullity of a Linear Transformation

Wednesday, September 14

The Rank-Nullity Theorem
Quiz: Kernels and Images of Linear Transformations

Friday, September 16

Composition and Inversion of Linear Transformations
Quiz: the Rank-Nullity Theorem

Monday, September 19 (Week 6)

Matrices of Linear Transformations
Quiz: Composition and Inversion of Linear Transformations

Tuesday, September 20

Group Work: Polynomials of Matrices

Wednesday, September 21

Change of Basis
Quiz: Matrices of Linear Transformations

Friday, September 23

Exam I Review
Quiz: Change of Basis

Monday, September 26 (Week 7)

Exam I

Canonical Forms for Matrices

Tuesday, September 27

Group Work: the Smith Normal Form of a Matrix

Wednesday, September 28

Determinants of 2×2 Matrices

Friday, September 30

Determinants of $n \times n$ Matrices
Quiz: Determinants of 2×2 Matrices

Monday, October 3 (Week 8)

The Adjugate of a Matrix
Quiz: Determinants of $n \times n$ Matrices

Tuesday, October 4

Group Work: Determinants

Wednesday, October 5

Polynomials Associated to Matrices
Quiz: the Adjugate of a Matrix

Friday, October 7

Fall Break

Monday, October 10 (Week 9)

Eigenvalues and Eigenvectors
Quiz: Polynomials Associated to Matrices

Tuesday, October 11

Group Work: the Characteristic and Minimal Polynomials

Wednesday, October 12

Eigenspaces
Quiz: Eigenvalues and Eigenvectors

Friday, October 14

Upper-Triangular Matrices
Quiz: Eigenspaces

Monday, October 17 (Week 10)

The Spectral Theorem I
Quiz: Upper-Triangular Matrices

Tuesday, October 18

Group Work: Eigenvalues, Eigenvectors, and Eigenspaces

Wednesday, October 19

The Spectral Theorem II
Quiz: the Spectral Theorem I

Friday, October 21

The Rational Canonical Form of a Matrix
Quiz: the Spectral Theorem II

Monday, October 24 (Week 11)

The Jordan Canonical Form of a Matrix
Quiz: the Rational Canonical Form of a Matrix

Tuesday, October 25

Group Work: Computing the Canonical Forms

Wednesday, October 26

Exam II Review
Quiz: the Jordan Canonical Form of a Matrix

Friday, October 28

Exam II

Inner Product Spaces

Monday, October 31 (Week 12)

Real Vector Spaces

Tuesday, November 1

Group Work: Real Vector Spaces

Wednesday, November 2

The Dot Product
Quiz: Real Vector Spaces

Friday, November 4

Parametric Equations
Quiz: the Dot Product

Monday, November 7 (Week 13)

Lines and Planes
Quiz: Parametric Equations

Tuesday, November 8

Group Work: Lines and Planes

Wednesday, November 9

Inner Products
Quiz: Lines and Planes

Friday, November 11

Orthogonal Bases
Quiz: Inner Products

Monday, November 14 (Week 14)

The Orthogonal Complement of a Vector Space
Quiz: Orthogonal Bases

Tuesday, November 15

Group Work: the Gram-Schmidt Process

Wednesday, November 16

Linear Functionals
Quiz: the Orthogonal Complement of a Vector Space

Friday, November 18

The Dual Space
Quiz: Linear Functionals

Monday, November 21 (Week 15)

Exam III Review
Quiz: the Dual Space

Tuesday, November 22

Exam III

Wednesday, November 23

Thanksgiving Break

Friday, November 25

Thanksgiving Break

Monday, November 28 (Week 16)

Final Exam Review: Matrices and Vector Spaces

Tuesday, November 29

Group Work: Final Exam Review

Wednesday, November 30

Final Exam Review: Canonical Forms of Matrices

Friday, December 2

Final Exam Review: Inner Product Spaces