Jacob Lawrence

Transcript of Mathematics Coursework *Last Updated: June 29, 2025*

MATH 7720, *Abstract Algebra*, Fall 2023, Dale Cutkosky
Basis properties of integers, fundamental theorem of arithmetic, introduction to groups, rings, and fields.
Textbook: *A First Course in Abstract Algebra*, 3rd edition, by Joesph Rotman.

MATH 8420, *Theory of Functions of Real Variables I*[1], Fall 2023, Carlo Morpurgo
An introduction to the theory of measure and integration, and differentiation.
Textbook: *Real Analysis: Modern Techniques and Their Applications*, 2nd edition, by Gerald B. Folland.

MATH 8425, *Complex Analysis I*, Fall 2023, Tanya Christiansen
Rigorous introduction to the theory of functions of complex variable. Topics include results about complex integration, the maximum modulus theorem (and related results), conformal mappings, infinite products and special functions, analytic continuation, harmonic functions, and further results for zeros of analytic functions.
Textbook: *Functions of One Complex Variable I*, 2nd edition, by John B. Conway.

MATH 7920, *Advanced Linear Algebra*, Spring 2024, Ian Aberbach
Study of vector spaces over arbitrary fields: topics include maps on finite dimensional vector spaces, bilinear and multilinear forms, invariant subspaces, and canonical forms.
Textbook: None.

MATH 8421, *Theory of Functions of Real Variables II*[1], Spring 2024, Carlo Morpurgo
General measure and integration theory. Elements of the theory of Hilbert and Banach spaces, linear functions, and linear operators.
Textbook: *Real Analysis: Modern Techniques and Their Applications*, 2nd edition, by Gerald B. Folland.

MATH 8430, *Differentiable Manifolds*, Spring 2024, Adam Helfer
This course is about calculus in very general settings, which may include curved spaces and abstractly defined spaces. Its origins go back to attempts to make maps of the Earth taking into account its curvature; its modern applications include mechanics, dynamical systems, partial differential equations, and most famously Einstein's theory of gravity.
Textbook: None.

MATH 8410, *Algebra I*[2], Fall 2024, Calin Chindris
Theory of algebraic structures–groups, rings, fields, algebraic and transcendental extensions of fields.
Textbook: *Abstract Algebra*, 3rd edition, by David S. Dummit and Richard M. Foote.

MATH 8630, *Harmonic Analysis I*, Fall 2024, Steven Hoffman
An introduction to the basic ideas of harmonic analysis in $\mathbb{R}^n$: Hardy-Littlewood Maximal Function, Lebesgue Differentiation, Convolutions and Approximate identities, Fourier transforms, inversions and Plancherel's theorem, Fractional Integration and Soblev spaces, Singular integral Theory and Fourier multipliers, Littlewood-Paley Theory, Fourier restriction and Strichartz estimates, and BMO and H^1.
Textbook: None.

[1] Part of the Analysis Qualyifing exam sequence
[2] Part of the Algebra Qualifying exam sequence.

MATH 8445, *Partial Differential Equations I*, Fall 2024, Samuel Walsh
Fourier and integral transforms, first and second order partial differential equations, methods of characteristics, Laplace's equation, Direchlet and Neumann problems, Green's functions and maximum principles.
Textbook: *Partial Differential Equations*, 2nd edition, by Lawrence C. Evans.

MATH 8302, *Topics in Harmonic Analysis (Theory of Distributions)*, Spring 2025, Tanya Christiansen
An introduction to the theory of distributions: Different classes of distributions, operations with distributions, Fourier transform, Schwartz functions and tempered distributions, wavefront sets, and applications.
Textbook: *Introduction to the Theory of Distributions*, 2nd edition, by F.G. Friedlander and M. Joshi.

MATH 8411, *Algebra II* [2], Spring 2025, Calin Chindris
Cover topics from Fields and Modules and Vector Spaces.
Textbook: *Abstract Algebra*, 3rd edition, by David S. Dummit and Richard M. Foote.

MATH 8631, *Harmonic Analysis II*, Spring 2025, Steven Hoffman
This will be a specialized course in which we shall present boundedness criteria for generalized singular integral operators and square functions (the so-called "$T1$" and "Tb" Theorems), as well as some of their applications, in particular, to the solution of the Kato square root problem.