Number & title	Grade	Instructor	Description & Book
M427K Differential Equations	A	Dr. Karen Uhlenbeck	Ordinary and partial differential equations and Fourier series.
M427L Vector Calculus	A-	Dr. Bartley Goddard	Elements of vector analysis and calculus of functions of several variables; including gradient; divergence; and curl of a vector field; multiple integrals and chain rules; length and area; line and surface integrals; Green's theorems in the plane and space; Stoke's theorem.
M372K Partial DIfferential Equations	A	Dr. Mikhail Vishik	Partial differential equations as basic models of flows; diffusion; dispersion; and vibrations. Topics include first- and second-order partial differential equations and classification (particularly the wave; diffusion; and potential equations); and their origins in applications and properties of solutions. Includes the study of characteristics; maximum principles; Green's functions; eigenvalue problems; and Fourier expansion methods. Text: Partial Differential Equations: An Introduction by Walter A. Strauss
M341 Linear ALgebra (Honors)	A	Dr. Ronny Hadani	Vector spaces; linear transformations; matrices; linear equations; determinants. Emphasis on rigor and proofs.
M328K Intro Number theory (IBL)	A	Dr. Ekin Ozman	Intended to be first introduction to proof writing. Properties of the integers; divisibility; prime numbers; congruences and residues; linear and quadratic forms. Text: the class is taught in the Inquiry-Based Learning (IBL) fashion whereas students prove every theorem themselves and essentially write their own textbook.
M365C Real Analysis I	B	Dr. Rachel Ward	A rigorous treatment of the real number system; Euclidean spaces; metric spaces; continuity of functions in metric spaces; differentiation and Riemann integration of real-valued functions of one real variable; and uniform convergence of sequences and series of functions.
M373K Algebraic Structures I	B+	Dr. Lewis Bowen	A study of groups; rings; and fields; including structure theory of finite groups; isomorphism theorems; polynomial rings; and principal ideal domains. Text: Topics in Algebra by I. N. Herstein (chapters 1;2;3;5)
M362M Intro to stochastic processes	A	Dr. Peter Mueller	Introduction to discrete and continuous time Markov chains; poison and renewal processes; birth and death processes and their applications Text: Essentials of Stochastic Processes by Rick Durrett (chapters 1-4)
M365G Curves and surfaces	A	Dr. Dan Freed	Calculus applied to curves and surfaces in three dimensions: curvature and torsion of space curves; Gauss map and curvature of surfaces; Gauss theorem; geodesics; and the Gauss-Bonnet theorem. Text: Elementary Differential Geometry by A.N. Pressley (all chapters)
M367K Topology I	A	Dr. Michael Starbird	An introduction to point set topology; including sets; functions; cardinal numbers; and culminates at the classification of 2-manifolds Text: the class is taught in the Inquiry-Based Learning (IBL) fashion whereas students prove every theorem themselves and essentially write their own textbook.

M373L Algebraic Structures II	A-	Dr. Ekin Ozman	Selected topics from Ring theory and Field Theory including quadratic number rings/fields and Galois theory. Texts: Algebra; by Michael Artin; Abstract Algebra by Dummit and Foote
M381D Complex Analysis	A-	Dr. Thomas Chen	Complex differentiation; Cauchy-Riemann equations; conformality. Holomorphic functions; analytic functions. Stereographic projection. Contour integration; Cauchy's theorem; Liouville's theorem; Morera's theorem. Harmonic functions; mean value theorem; maximum principle. Moebius transforms; Schwarz lemma. Automorphisms of the unit disc and of the upper half plane. Holomorphic functions on the Riemann sphere. Isolated singularities and residues; meromorphic functions; Laurent series. Winding number; cycles; null homology; basics on differential forms; generalized Cauchy theorem; residue theorem. Uniqueness theorem; analytic continuation. Convergence and normal families. Mittag-Leffler theorem; Weierstrass and Hadamard factorization theorems; order and genus of entire functions. Riemann mapping theorem. Poisson formula; Poisson kernel. Harnack inequality. Approximate identities. Dirichlet problem on the unit disc with continuous and L1 boundary data. Riemann surfaces; basic definitions and examples. Analytic functions between Riemann surfaces. Valency; degree; genus; Riemann-Hurwitz formula. Elliptic functions.
M381C Real Analysis	A	Dr. Lewis Bowen	Outermeasures; measures; sigma-algebras; measurability and continuity of functions; Littlewood's 3 principles; Lusin's Theorem; Lebesgue integration; Riemann integration; Lebesgue differentiation theorem; convergence theorems; functions of bounded variations; absolute continuous functions; convex functions; L^p spaces; Banach spaces; Hilbert spaces; Signed measures; Hahn decompostions; Jordan decompositions; Radon-Nikodym; Dual of L^p; Caratheodory's Extension Theorem; Product measures; Fubini's and Tonelli's; convolutions; spaces of measures; Riesz representation theorem; Fourier transforms Text:Measure and Integral by R.L. Wheeden and A. Zygmund
M382C Algebraic Topology	N/A	Dr. Michael Starbird	Classification of 2-manifolds; homotopy; fundamental groups; Van Kampen theorem; covering spaces; universal covers; subgroup correspondence; Z2 homology; mayer-vietoris sequences; applications (in fixed point theorem; Jordan separation theorem etc.); Z homology. Text: the class is taught in the Inquiry-Based Learning (IBL) fashion whereas students prove every theorem themselves and essentially write their own textbook.

Homotopy Type Theory	audit	Dr. Andrew Blumberg	introducing homotopy type theory from propositional logic; (ETCS) set theory; type and dependent types; lambda-calculus; correspondence with cartesian closed categories; fibration cofibration; inductive types; simplicial sets; kan complex and fibrations; univalence axioms; path inductions; h-levels; inductive types; and finally proved π1(S^1)~=Z using homotopy type theory methods.
M382D Differential	N/A	Dr. Andrew Neitzke	Manifolds and maps; differential forms; transversality; and intersection theory.