Course | Instructor | School | Department | Meeting Times

161 Courses Found

Emerging Scholars: Problem Solving Exploration
MATH ESPA 001 | Grundmeier | FAS | Mathematics

In his seminal work from 1945, How to Solve It, George Polya introduced principles of mathematical problem solving that are widely applicable to problems in science and engineering. This year-long class focuses on building a powerful and portable problei ...

2018 Fall
Full Term
S M **T** W **Th** F S
9:00am - 10:15am

Emerging Scholars: Problem Solving Exploration
MATH ESPA 002 | Grundmeier | FAS | Mathematics

In his seminal work from 1945, How to Solve It, George Polya introduced principles of mathematical problem solving that are widely applicable to problems in science and engineering. This year-long class focuses on building a powerful and portable problei ...

2018 Fall
Full Term
S M **T** W **Th** F S
3:00pm - 4:15pm

Emerging Scholars: Problem Solving Exploration
MATH ESPB 001 | Grundmeier | FAS | Mathematics

In his seminal work from 1945, How to Solve It, George Polya introduced principles of mathematical problem solving that are widely applicable to problems in science and engineering. This year-long class focuses on building a powerful and portable problem-solvi ...

2019 Spring
Full Term
S M **T** W **Th** F S
9:00am - 10:15am

Emerging Scholars: Problem Solving Exploration
MATH ESPB 002 | Grundmeier | FAS | Mathematics

In his seminal work from 1945, How to Solve It, George Polya introduced principles of mathematical problem solving that are widely applicable to problems in science and engineering. This year-long class focuses on building a powerful and portable problem-solvi ...

2019 Spring
Full Term
S M **T** W **Th** F S
3:00pm - 4:15pm

Introduction to Functions and Calculus I
MATH MA | Kelly | FAS | Mathematics

The study of functions and their rates of change. Fundamental ideas of calculus are introduced early and used to provide a framework for the study of mathematical modeling involving algebraic, exponential, and logarithmic functions. Thorough understanding ...

2018 Fall
Full Term
TBA

Introduction to Functions and Calculus II
MATH MB | Kelly | FAS | Mathematics

Continued investigation of functions and differential calculus through modeling; an introduction to integration with applications; an introduction to differential equations. Solid preparation for Mathematics 1b.

2019 Spring
Full Term
TBA

Introduction to Calculus
MATH 1A | Braley | FAS | Mathematics

The development of calculus by Newton and Leibniz ranks among the greatest achievements of the past millennium. This course will help you see why by introducing: how differential calculus treats rates of change; how integral calculus treats accumulation; and hc ...

2018 Fall
Full Term
TBA

Introduction to Calculus
MATH 1A | Demers | FAS | Mathematics

The development of calculus by Newton and Leibniz ranks among the greatest achievements of the past millennium. This course will help you see why by introducing: how differential calculus treats rates of change; how integral calculus treats accumulation; and hc ...

2019 Spring
Full Term
S **M** T **W** Th **F** S
10:30am - 11:45am

Calculus, Series, and Differential Equations
MATH 1B | Cain | FAS | Mathematics

Speaking the language of modern mathematics requires fluency with the topics of this course: infinite series, integration, and differential equations. Model practical situations using integrals and differential equations. Learn how to represent interesti ...

2018 Fall
Full Term
TBA

Calculus, Series, and Differential Equations
MATH 1B | Grundmeier | FAS | Mathematics

Speaking the language of modern mathematics requires fluency with the topics of this course: infinite series, integration, and differential equations. Model practical situations using integrals and differential equations. Learn how to represent interesti ...

2019 Spring
Full Term
TBA

Multivariable Calculus for Social Sciences
MATH 18 | Hsu | FAS | Mathematics

Focus on concepts and techniques of multivariable calculus most useful to those studying the social sciences, particularly economics: functions of several variables; partial derivatives; directional derivatives and the gradient; constrained and unconstrain ...

2018 Fall
Full Term
S **M** T **W** Th **F** S
1:30pm - 2:45pm

Modeling and Differential Equations for the Life Sciences
MATH 19A | Cain | FAS | Mathematics

Considers the construction and analysis of mathematical models that arise in the life sciences, ecology and environmental life science. Introduces mathematics that include multivariable calculus, differential equations in one or more variables, vecto ...

2018 Fall
Full Term
S **M** T **W** Th **F** S
10:30am - 11:45am

Linear Algebra, Probability, and Statistics for the Life Sciences

MATH 19B | Belanger-Rioux | FAS | Mathematics

Probability, statistics and linear algebra with applications to life sciences, chemistry, and environmental life sciences. Linear algebra includes matrices, eigenvalues, eigenvectors, determinants, and applications to probability, statistics, dynamical systems. Ba: ...

2019 Spring
Full Term
S M T W Th F S
10:30am - 11:45am

Multivariable Calculus

MATH 21A | Chen | FAS | Mathematics

To see how calculus applies in practical situations described by more than one variable, we study: Vectors, lines, planes, parameterization of curves and surfaces, partial derivatives, directional derivatives and the gradient, optimization and critical poi ...

2018 Fall
Full Term
TBA

Multivariable Calculus

MATH 21A | Paul | FAS | Mathematics

To see how calculus applies in practical situations described by more than one variable, we study: Vectors, lines, planes, parameterization of curves and surfaces, partial derivatives, directional derivatives and the gradient, optimization and critical poi ...

2019 Spring
Full Term
TBA

Linear Algebra and Differential Equations

MATH 21B | Demers | FAS | Mathematics

Matrices provide the algebraic structure for solving myriad problems across the sciences. We study matrices and related topics such as linear transformations and linear spaces, determinants, eigenvalues, and eigenvectors. Applications include dynamical systen ...

2018 Fall
Full Term
TBA

Linear Algebra and Differential Equations

MATH 21B | Chen | FAS | Mathematics

Matrices provide the algebraic structure for solving myriad problems across the sciences. We study matrices and related topics such as linear transformations and linear spaces, determinants, eigenvalues, and eigenvectors. Applications include dynamical systen ...

2019 Spring
Full Term
TBA

Vector Calculus and Linear Algebra I

MATH 22A | Knill | FAS | Mathematics

This course covers multivariable calculus and linear algebra for students interested in mathematical sciences. It covers the same topics as Mathematics 21, but does so with more rigor. Students are taught techniques of proof and mathematical reasoning. T ...

2018 Fall
Full Term
S M T W Th F S
9:00am - 10:15am

Vector Calculus and Linear Algebra II

MATH 22B | Knill | FAS | Mathematics

A continuation of Mathematics 22a

2019 Spring
Full Term
S M T W Th F S
9:00am - 10:15am

Linear Algebra and Real Analysis I

MATH 23A 001 | Bamberg | FAS | Mathematics

Linear algebra: vectors, linear transformations and matrices, scalar and vector products, basis and dimension, eigenvectors and eigenvalues, including an introduction to the R scripting language. Single-variable real analysis: sequences and series, limits a ...

2018 Fall
Full Term
S M T W Th F S
3:00pm - 5:45pm

Linear Algebra and Real Analysis I

MATH 23A 002 | Bamberg | FAS | Mathematics

Linear algebra: vectors, linear transformations and matrices, scalar and vector products, basis and dimension, eigenvectors and eigenvalues, including an introduction to the R scripting language. Single-variable real analysis: sequences and series, limits a ...

2018 Fall
Full Term
S M T W Th F S
12:00pm - 2:45pm

Linear Algebra and Real Analysis II

MATH 23B | Bamberg | FAS | Mathematics

A rigorous, integrated treatment of linear algebra and multivariable calculus. Topics: Riemann and Lebesgue integration, determinants, change of variables, volume of manifolds, differential forms, and exterior derivative. Stokes's theorem is present ...

2019 Spring
Full Term
S M T W Th F S
12:00pm - 2:45pm

Mathematics for Computation, Statistics, and Data Science

MATH 23C | Bamberg | FAS | Mathematics

Proof strategies and logic. Sets, countability, sigma fields, and axiomatic foundations of probability. Summation of series and evaluation of multiple integrals, with emphasis on calculation of expectation and variance. Abstract vector spaces and inner produ ...

2019 Spring
Full Term
S M T W Th F S
3:00pm - 5:45pm

Theoretical Linear Algebra and Real Analysis I

MATH 25A | Tshishiku | FAS | Mathematics

A rigorous treatment of linear algebra. Topics include: Construction of number systems; fields, vector spaces and linear transformations; eigenvalues and eigenvectors, determinants and inner products. Metric spaces, compactness and connectedness.

2018 Fall
Full Term
S M T W Th F S
9:00am - 10:15am

Theoretical Linear Algebra and Real Analysis II

MATH 25B | Tshishiku | FAS | Mathematics

A rigorous treatment of basic analysis. Topics include: convergence, continuity, differentiation, the Riemann integral, uniform convergence, the Stone-Weierstrass theorem, Fourier series, differentiation in several variables. Additional topics, including t ...

2019 Spring
Full Term
S M T W Th F S
9:00am - 10:15am

Studies in Algebra and Group Theory

MATH 55A | Harris | FAS | Mathematics

A rigorous introduction to abstract algebra, including group theory and linear algebra. This course covers the equivalent of ...

2018 Fall
Full Term
S M T W Th F S
10:30am - 11:45am

Studies in Real and Complex analysis

MATH 55B | Harris | FAS | Mathematics

A rigorous introduction to real and complex analysis. This course covers the equivalent of Mathematics 25b and Mathematics 113, and prepares students for Mathematics 114 and other advanced courses in analysis.

2019 Spring
Full Term
S M T W Th F S
10:30am - 11:45am

Reading Course for Senior Honors Candidates

MATH 60R | Taubes | FAS | Mathematics

Advanced reading in topics not covered in courses.

2018 Fall
Full Term
TBA

Reading Course for Senior Honors Candidates

MATH 60R | Taubes | FAS | Mathematics

Advanced reading in topics not covered in courses.

2019 Spring
Full Term
TBA

Supervised Reading and Research

MATH 91R | Taubes | FAS | Mathematics

Programs of directed study supervised by a person approved by the Department.

2018 Fall
Full Term
TBA

Supervised Reading and Research

MATH 91R | Taubes | FAS | Mathematics

Programs of directed study supervised by a person approved by the Department.

2019 Spring
Full Term
TBA

Tutorial

MATH 99R | Taubes | FAS | Mathematics

Supervised small group tutorial. Topics to be arranged.

2018 Fall
Full Term
TBA

Tutorial

MATH 99R | Taubes | FAS | Mathematics

Supervised small group tutorial. Topics to be arranged.

2019 Spring
Full Term
TBA

Sets, Groups and Topology

MATH 101 | Vasey | FAS | Mathematics

An introduction to rigorous mathematics, axioms, and proofs, via topics including set theory, symmetry groups, and low-dimensional topology.

2018 Fall
Full Term
S M T W Th F S
9:00am - 10:15am

Much Ado About Everything: The Mathematics of Leonhard Euler

MATH 102 | Dunham | FAS | Mathematics

The focus of this course is Leonhard Euler (1707-1783), one of history's greatest mathematicians. After surveying 16th and 17th century results that underlay his work, we consider Euler's contributions to number theory, calculus, algebra, combinatorics, a...

2019 Spring
Full Term
S M T W Th F S
1:30pm - 2:45pm

Vector Space Methods for Differential Equations

MATH 110 | TBA | FAS | Mathematics

Develops the theory of inner product spaces, both finite-dimensional and infinite-dimensional, and applies it to a variety of ordinary and partial differential equations. Topics: existence and uniqueness theorems, Sturm-Liouville systems, orthogonal polynomia...

2019 Spring
Full Term
S M T W Th F S
9:00am - 10:15am

Introductory Real Analysis

MATH 112 | Auroux | FAS | Mathematics

An introduction to mathematical analysis and the theory behind calculus. An emphasis on learning to understand and construct proofs. Covers limits and continuity in metric spaces, uniform convergence and spaces of functions, the Riemann integral.

2019 Spring
Full Term
S M T W Th F S
12:00pm - 1:15pm

Complex Analysis

MATH 113 | Siu | FAS | Mathematics

Analytic functions of one complex variable: power series expansions, contour integrals, Cauchy's theorem, Laurent series and the residue theorem. Some applications to real analysis, including the evaluation of indefinite integrals. An introduction to some spec...

2019 Spring
Full Term
S M T W Th F S
3:00pm - 4:15pm

Analysis of Function Spaces, Measure and Integration

MATH 114 | Kronheimer | FAS | Mathematics

Lebesgue measure and integration; general topology; introduction to L p spaces, Banach and Hilbert spaces, and duality.

2018 Fall
Full Term
S M T W Th F S
10:30am - 11:45am

Methods of Analysis

MATH 115 | Cheung | FAS | Mathematics

Complex functions; Fourier analysis; Hilbert spaces and operators; Laplace's equations; Bessel and Legendre functions; symmetries;

2018 Fall
Full Term
S M T W Th F S

10:30am - 11:45am

Real Analysis, Convexity, and Optimization

MATH 116 Lemm FAS Mathematics

Develops the theory of convex sets, normed infinite-dimensional vector spaces, and convex functionals and applies it as a unifying principle to a variety of optimization problems such as resource allocation, production planning, and optimal control. Topics inclu ...

2018 Fall
Full Term
S M **T** W Th F S
3:00pm - 4:15pm

Probability and Random Processes with Economic Applications

MATH 117 Bamberg FAS Mathematics

A self-contained treatment of the theory of probability and random processes with specific application to the theory of option pricing. Topics: axioms for probability, calculation of expectation by means of Lebesgue integration, conditional probability a ...

2019 Spring
Full Term
S M **T** W Th F S
12:00pm - 1:15pm

Dynamical Systems

MATH 118R Cain FAS Mathematics

Introduction to dynamical systems theory with a view toward applications. Topics include existence and uniqueness theorems for flows, qualitative study of equilibria and attractors, iterated maps, and bifurcation theory.

2019 Spring
Full Term
S **M** T **W** Th F S
3:00pm - 4:15pm

Linear Algebra and Applications

MATH 121 Kupers FAS Mathematics

Real and complex vector spaces, linear transformations, determinants, inner products, dual spaces, and eigenvalue problems. Applications to some or all of the following: Ggeometry, systems of linear differential equations, optimization, and Markov processe ...

2018 Fall
Full Term
S M **T** W Th F S
10:30am - 11:45am

Algebra I: Theory of Groups and Vector Spaces

MATH 122 Balibanu FAS Mathematics

Groups and group actions, vector spaces and their linear transformations, bilinear forms and linear representations of finite groups.

2018 Fall
Full Term
S **M** T **W** Th F S
12:00pm - 1:15pm

Algebra II: Theory of Rings and Fields

MATH 123 Kronheimer FAS Mathematics

Rings and modules. Polynomial rings. Field extensions and the basic theorems of Galois theory. Structure theorems for modules.

2019 Spring
Full Term
S M T **W** Th **F** S
10:30am - 11:45am

Number Theory

MATH 124 Taubes FAS Mathematics

Factorization and the primes; congruences; quadratic residues and reciprocity; continued fractions and approximations; Pell's equation; selected Diophantine equations; theory of integral quadratic forms.

2018 Fall
Full Term
S **M** T **W** Th F S
9:00am - 10:15am

Number Fields

MATH 129 Kisin FAS Mathematics

Algebraic number theory: number fields, unique factorization of ideals, finiteness of class group, structure of unit group, Frobenius elements, local fields, ramification, weak approximation, adeles, and ideles.

2019 Spring
Full Term
S **M** T **W** Th F S
1:30pm - 2:45pm

Classical Geometry

MATH 130 Knudsen FAS Mathematics

Presents several classical geometries, these being the affine, projective, Euclidean, spherical and hyperbolic geometries. They are viewed from many different perspectives, some historical and some very topical. Emphasis on reading and writing proofs.

2019 Spring
Full Term
S M **T** W Th F S
10:30am - 11:45am

Topological Spaces and Fundamental Group

MATH 131 Ullery FAS Mathematics

First, an introduction to abstract topological spaces, their properties (compactness, connectedness, metrizability) and their corresponding continuous functions and mappings. Then, an introduction to algebraic topology including homotopy theo ...

2018 Fall
Full Term
S M **T** W Th F S
1:30pm - 2:45pm

Differential Topology

MATH 132 Kupers FAS Mathematics

Differential manifolds, smooth maps and transversality. Winding numbers, vector fields, index and degree. Differential forms, Stokes' theorem, introduction to cohomology.

2019 Spring
Full Term
S M T **W** Th **F** S
12:00pm - 1:15pm

Differential Geometry

MATH 136 TBA FAS Mathematics

The course is an introduction to Riemannian geometry with the focus (for the most part) being the Riemannian geometry of curves and surfaces in space where the fundamental notions can be visualized.

2018 Fall
Full Term
S M **T** W Th F S
1:30pm - 2:45pm

Algebraic Geometry

MATH 137 Ullery FAS Mathematics

Affine and projective spaces, plane curves, Bezout's theorem, singularities and genus of a plane curve, Riemann-Roch theorem.

2019 Spring
Full Term
S M **T** W Th F S
10:30am - 11:45am

Mathematical Logic I

MATH 141A Vasey FAS Mathematics

Introduction to mathematical logic focusing on the fundamentals of first-order logic (language, axioms, completeness theorem, etc.)

2018 Fall
Full Term
S **M** T W Th **F** S

and the basic results of model theory (compactness), Lowenheim-Skolem, omitting typesetc

12:00pm - 1:15pm

Mathematical Logic II

MATH 141B | Boney | FAS | Mathematics

Introduction to the incompleteness phenomenon, covering the incompleteness theorems and the basic results of recursion theory.

2019 Spring
Full Term
S M T W Th F S
9:00am - 10:15am

[Set Theory I]

MATH 145A | TBA | FAS | Mathematics

An introduction to set theory: ordinals, cardinals, transfinite induction, the cummulative hierarchy, ZFC, the theory of the infinite, and the basics of independence.

Not Offered
Likely 2019 Fall

[Set Theory II]

MATH 145B | TBA | FAS | Mathematics

An introduction to large cardinals and their inner models, with special emphasis on Woodin's recent advances toward finding an ultimate version of Godel's L. Topics include: Weak extender models, the HOD Dichotomy Theorem, and the HOD Conjecture.

Not Offered
Likely 2020 Spring

Discrete Mathematics

MATH 152 001 | Bamberg | FAS | Mathematics

An introduction to finite groups, finite fields, finite geometry, finite topology, combinatorics, graph theory, and (for section 2 only) elementary algebraic topology. A recurring theme of the course is the symmetry group of the regular icosahedron. Elementa ...

2018 Fall
Full Term
S M T W Th F S
12:00pm - 1:15pm

Discrete Mathematics

MATH 152 002 | Bamberg | FAS | Mathematics

An introduction to finite groups, finite fields, finite geometry, finite topology, combinatorics, graph theory, and (for section 2 only) elementary algebraic topology. A recurring theme of the course is the symmetry group of the regular icosahedron. Elementa ...

2018 Fall
Full Term
S M T W Th F S
10:30am - 11:45am

[Mathematical Biology-Evolutionary Dynamics]

MATH 153 | TBA | FAS | Mathematics

Introduces basic concepts of mathematical biology and evolutionary dynamics: evolution of genomes, quasi-species, finite and infinite population dynamics, chaos, game dynamics, evolution of cooperation and language, spatial models, evolutionary gra ...

Not Offered
Likely 2019 Fall

Probability Theory

MATH 154 | Jagannath | FAS | Mathematics

An introduction to probability theory. Discrete and continuous random variables; distribution and density functions for one and two random variables; conditional probability. Generating functions, weak and strong laws of large numbers, and the central lin ...

2019 Spring
Full Term
S M T W Th F S
9:00am - 10:15am

Combinatorics

MATH 155R | Williams | FAS | Mathematics

An introduction to algebraic combinatorics that comes from the representation theory of the symmetric group. We will start with a quick overview of the representation theory of finite groups and then cover topics such as Young tableaux, Specht modules, the hoc ...

2019 Spring
Full Term
S M T W Th F S
1:30pm - 2:45pm

[Mathematical Foundations of Statistical Software]

MATH 156 | TBA | FAS | Mathematics

Presents the probability theory and statistical principles which underly the tools that are built into the open-source programming language R. Each class presents the theory behind a statistical tool, then shows how the implementation of that tool in R can be us ...

Not Offered
Likely 2019 Fall

Mathematics in the World

MATH 157 | Harris | FAS | Mathematics

An interactive introduction to problem solving with an emphasis on subjects with comprehensive applications. Each class will be focused around a group of questions with a common topic: logic, information, number theory, probability, and algorithms.

2019 Spring
Full Term
S M T W Th F S
1:30pm - 2:45pm

[Introduction to the Mathematics of Quantum Computing]

MATH 162 | TBA | FAS | Mathematics

This course will introduce the mathematics for quantum computation. This includes basic notions from quantum mechanics, linear algebra, probability theory and number theory. No a priori knowledge of linear algebra is required except for a familiarity with ba ...

Not Offered
Likely 2020 Spring

Making Math Material

MATH 168 | Whitney | FAS | Mathematics

How can we make mathematical ideas material, both by translating them into physical embodiments and by making them more accessible and relevant to a broader audience? Conversely, how can mathematics inform the designs we make for physical structur ...

2018 Fall
Full Term
S M T W Th F S
1:30pm - 2:45pm

Real Analysis

MATH 212A | Yau | FAS | Mathematics

Measure theory, functional analysis, Sobolev spaces and introduction to harmonic analysis.

2018 Fall
Full Term
S M T W Th F S
12:00pm - 1:15pm

Advanced Real Analysis

MATH 212BR | TBA | FAS | Mathematics

Continuation of topics in real analysis, harmonic analysis and functional analysis. Possible topics include: L^p spaces; Banach spaces

2019 Spring
Full Term
S M T W Th F S

and duality: weak and weak* convergence: Banach-Alaoglu Theorem: elements of the theory of distributions, methods from t...

9:00am - 10:15am

Advanced Complex Analysis

MATH 213A | Siu | FAS | Mathematics

Fundamentals of complex analysis, and further topics such as elliptic functions, canonical products, conformal mappings, the zeta function and prime number theorem, and Nevanlinna theory.Prerequisites: Basic complex analysis, topology of covering spac...

2018 Fall
Full Term
S M T W Th F S
3:00pm - 4:15pm

Riemann Surfaces

MATH 213BR | McMullen | FAS | Mathematics

Fundamentals of algebraic curves as complex manifolds of dimension one. Topics may include branched coverings, sheaves and cohomology, potential theory, uniformization and moduli.

2019 Spring
Full Term
S M T W Th F S
10:30am - 11:45am

Algebra

MATH 221 | Balibanu | FAS | Mathematics

A first course in Algebra: Noetherian rings and modules, Hilbert basis theorem, Cayley-Hamilton theorem, integral dependence, Galois theory, Noether normalization, the Nullstellensatz, localization, primary decomposition. Representation theory of fini...

2018 Fall
Full Term
S M T W Th F S
3:00pm - 4:15pm

Lie Groups and Lie Algebras

MATH 222 | Schmid | FAS | Mathematics

Lie theory, including the classification of semi-simple Lie algebras and/or compact Lie groups and their representations.

2018 Fall
Full Term
S M T W Th F S
12:00pm - 1:15pm

Algebraic Number Theory

MATH 223A | Miller | FAS | Mathematics

A graduate introduction to algebraic number theory. Topics: the structure of ideal class groups, groups of units, a study of zeta functions and L-functions, local fields, Galois cohomology, local class field theory, and local duality.

2018 Fall
Full Term
S M T W Th F S
3:00pm - 4:15pm

Algebraic Number Theory

MATH 223B | Miller | FAS | Mathematics

Continuation of Mathematics 223a. Topics: adeles, global class field theory, duality, cyclotomic fields. Other topics may include: Tate's thesis or Euler systems.

2019 Spring
Full Term
S M T W Th F S
3:00pm - 4:15pm

[Representations of Reductive Lie Groups]

MATH 224 | TBA | FAS | Mathematics

This course will introduce algebraic groups, along with some necessary tools from algebraic geometry. The goal of the course is to arrive at the classification of reductive groups in terms of root data.

Not Offered
Likely 2020 Spring

Introduction to Analytic Number Theory

MATH 229X | Elkies | FAS | Mathematics

Fundamental methods, results, and problems of analytic number theory. Riemann zeta function and the Prime Number Theorem; Dirichlet's theorem on primes in arithmetic progressions; lower bounds on discriminants from functional equations; sieve metho...

2019 Spring
Full Term
S M T W Th F S
10:30am - 11:45am

Differential Geometry

MATH 230A | Gimre | FAS | Mathematics

Smooth manifolds (vector fields, differential forms, and their algebraic structures; Frobenius theorem), Riemannian geometry (metrics, connections, curvatures, geodesics), Lie groups, principal bundles and associated vector bundles with their connectio...

2018 Fall
Full Term
S M T W Th F S
9:00am - 10:15am

Advanced Differential Geometry

MATH 230BR | Yau | FAS | Mathematics

A continuation of Mathematics 230a. Topics in differential geometry: Analysis on manifolds. Laplacians. Hodge theory. Spin structures. Clifford algebras. Dirac operators. Index theorems. Applications.

2019 Spring
Full Term
S M T W Th F S
12:00pm - 1:15pm

Algebraic Topology

MATH 231A | Hopkins | FAS | Mathematics

Covering spaces and fibrations. Simplicial and CW complexes, Homology and cohomology, universal coefficients and Künneth formulas. Hurewicz theorem. Manifolds and Poincaré duality.

2018 Fall
Full Term
S M T W Th F S
1:30pm - 2:45pm

Advanced Algebraic Topology

MATH 231BR | Kupers | FAS | Mathematics

Continuation of Mathematics 231a. Topics may include stable homotopy theory, topological or algebraic K-theory, characteristic classes and vector bundles, cobordism, and categorical homotopy theory.

2019 Spring
Full Term
S M T W Th F S
3:00pm - 4:15pm

Introduction to Algebraic Geometry I

MATH 232A | Gaitsgory | FAS | Mathematics

Introduction to complex algebraic curves, surfaces, and varieties.

2018 Fall
Full Term
S M T W Th F S
12:00pm - 1:15pm

Algebraic Geometry II

MATH 232BR | Cheung | FAS | Mathematics

The course will cover the classification of complex algebraic surfaces.

2019 Spring
Full Term
S M T W Th F S

12:00pm - 1:15pm

Theory of Schemes I

MATH 233A | Tripathy | FAS | Mathematics

An introduction to the theory and language of schemes. Textbooks: Algebraic Geometry by Robin Hartshorne and Geometry of Schemes by David Eisenbud and Joe Harris. Weekly homework will constitute an important part of the course.

2018 Fall
Full Term
S M T W Th F S
10:30am - 11:45am

Theory of Schemes II

MATH 233BR | Tripathy | FAS | Mathematics

A continuation of Mathematics 233a. Will cover the theory of schemes, sheaves, and sheaf cohomology.

2019 Spring
Full Term
S M T W Th F S
1:30pm - 2:45pm

Evolutionary Dynamics

MATH 243 | Nowak | FAS | Mathematics

Advanced topics of evolutionary dynamics. Seminars and research projects.

2019 Spring
Full Term
S M T W Th F S
3:00pm - 4:15pm

Topics on Geometric Analysis

MATH 251X | Yau | FAS | Mathematics

A discussion of how nonlinear analysis is applied to solve problems in geometry and physics. We will cover some basic materials on nonlinear partial differential equations. A discussion of problems related to questions in general relativity such as definitions ...

2018 Fall
Full Term
S M T W Th F S
10:30am - 11:45am

Symplectic Manifolds and Lagrangian Submanifolds

MATH 253Y | Auroux | FAS | Mathematics

The course will start with a review of standard symplectic topology: symplectic manifolds, symplectomorphisms, Lagrangian submanfilds, neighborhood theorems, almost-complex structures and compatibility, Hamiltonian group actions. The focus will th ...

2018 Fall
Full Term
S M T W Th F S
10:30am - 11:45am

L-Functions and Arithmetic Statistics

MATH 258 | Mazur | FAS | Mathematics

Modular Symbols, Special values of L-functions, Selmer groups, and (statistical) distributions related to them. We will study this in connection with expected behavior of the ranks of Mordell-Weil groups of varieties.

2019 Spring
Full Term
S M T W Th F S
12:00pm - 1:15pm

Algebraic Vector Bundles and Motivic Homotopy Theory

MATH 263 | Hopkins | FAS | Mathematics

The work of Lindel, Quillen and Suslin on a question of Serre shows that the set of isomorphism classes of algebraic vector bundles over a smooth affine variety over a field is "homotopy invariant". This means that questions about algebraic vector bundles can ...

2019 Spring
Full Term
S M T W Th F S
1:30pm - 2:45pm

Topics in Analysis: Matrix Inequalities

MATH 266Y | Lemm | FAS | Mathematics

While matrices arise in a variety of analytical contexts, many common techniques for estimating scalar quantities do not extend to matrices. In this course, we will use methods from convex analysis, complex analysis and spectral theory to develop a toolbox ...

2019 Spring
Full Term
S M T W Th F S
3:00pm - 4:15pm

Dynamical and Spectral Properties of Large Many-Body Quantum Systems

MATH 267X | TBA | FAS | Mathematics

An analysis of spectral and dynamical properties of large bosonic many-body quantum systems. We will start by recalling first some basic concepts of quantum mechanics (self-adjoint operators, basic criteria for self-adjointness, spectral theorem and spectral typ ...

2018 Fall
Full Term
S M T W Th F S
9:00am - 10:15am

Parabolic Equations on Complex Manifolds

MATH 269Y | TBA | FAS | Mathematics

An introduction to the theory of linear parabolic equations, including parabolic Schauder estimates and the Krylov-Safonov Harnack ineqality. An application of these techniques to study complex geometry via parabolic methods. Possible topics: Kahler-Ricci flo ...

2019 Spring
Full Term
S M T W Th F S
1:30pm - 2:45pm

Geometry and Algebra of Computational Complexity

MATH 278 | Hyeon | FAS | Mathematics

The mathematical aspects of computational complexity theory will be broadly covered. We shall start with the basics of complexity theory (such as various notions of complexity and NP completeness), discuss other computation models and intractability results, a ...

2018 Fall
Full Term
S M T W Th F S
3:00pm - 4:15pm

Random Matrices and Applications

MATH 286 | Yau | FAS | Mathematics

We will cover two topics in random matrix theory. 1. Concentration inequalities. 2. Stochastic flow method. We will start with a review of basic results in random matrices like local laws and Dyson's Brownian motions. We will discuss coupling methods ...

2019 Spring
Full Term
S M T W Th F S
12:00pm - 1:15pm

Analytic Methods in Differential Geometry

MATH 291 | Gimre | FAS | Mathematics

The injection of analysis into differential geometry distinguishes certain geometric objects, such as Ricci flows, Yang-Mills connections, and minimal submanifolds. Since these objects are defined as solutions of geometric partial differential equations, th ...

2019 Spring
Full Term
S M T W Th F S
10:30am - 11:45am

Cluster Algebras and Cluster Varieties

MATH 292 | Cheung | FAS | Mathematics

2018 Fall
Full Term

An introduction to the cluster theory. Both the algebraic and geometric points of view will be discussed in this course. On the

S M T W Th F S

1:30pm - 2:45pm

Topics in Discrete Probability: Random Structures and Algorithms

MATH 295 | Gamarnik | FAS | Mathematics

2018 Fall
Full Term

An introduction to probabilistic reasoning for random structures, including random graphs, graphical models and Markov Random Fields (MRF). Topics include: large deviations theory and concentration inequalities Theory of random graphs,the moment metho ...

S M T W Th F S

1:30pm - 2:45pm

Teaching Undergraduate Mathematics

MATH 300 | Al-Aidroos | FAS | Mathematics

2018 Fall
Full Term

Become an effective instructor. This course focuses on observation, practice, feedback, and reflection providing insight into teaching and learning. Involves iterated videotaped micro-teaching sessions, accompanied by individual consultations. Required of ...

S M T W Th F S

1:30pm - 2:45pm

Topics in Algebraic Topology

MATH 304 | Hopkins | FAS | Mathematics

2018 Fall
Full Term

TBA

Topics in Algebraic Topology

MATH 304 | Hopkins | FAS | Mathematics

2019 Spring
Full Term

TBA