Department of Mathematics

Previous Courses - Spring 2011

I. GRADUATE COURSE CATALOG

II. GRADUATE COURSE SPRING 2011 - (1/18/2011 TO 5/13/2011)

SENIOR UNDERGRADUATE COURSES

Math 4309 - Section# 20471 - Mathematical Biology - by K. Josic
Math 4315 - Section# 13937 - Graph Theory with Applications - by Fajtlowicz
Math 4332 - Section# 13938 - Introduction to Real Analysis - by M. Field
Math 4351 - Section# 20472 - Differential Geometry - by M. Ru
Math 4365 - Section# 13939 - Numerical Analysis - by T. Pan
Math 4377 - Section# 17790 - Advanced Linear Algebra I - by A. Torok
Math 4378 - Section# 13940 - Advanced Linear Algebra II - by G. Heier
Math 4380 - Section# 13941 - A Mathematical Introduction to Options - by I. Timofeyev
Math 4383 - Section# 23355 - Number Theory - by J. Hardy
Math 4389 - Section# 13942 - Survey of Undergraduate Mathematics - by G. Etgen

GRADUATE ONLINE COURSES

Math 5330 - Section# 16310 - Abstract algebra - by K. Kaiser
Math 5332 - Section# 13970 - Differential equations - by G. Etgen
Math 5383 - Section# 13971 - Number theory - by M.Ru
Math 5386 - Section# 19126 - Regression and Linear Models - by C. Peters
Math 5397 - Section# 20468 - Complex analysis - by S. Ji

GRADUATE COURSES

Math 6303 - Section# 13979 - Modern Algebra - by M. Tomforde
Math 6308 - Section# 16677 - Advanced Linear Algebra I- by A. Torok
Math 6309 - Section# 16678 - Advanced Linear Algebra II - by G. Heier
Math 6313 - Section# 16676 - Introduction to Real Analysis - by M. Field
Math 6321 - Section# 13997 - Theory of Functions of a Real Variable - by B. Bodmann
Math 6325 - Section# 20470 - Differential Equations II - by M. Nicol
Math 6361 - Section# 16687 - Applicable Analysis - by Y. Gorb
Math 6367 - Section# 13998 - Optimization and Variational Methods - by Z. Zhang
Math 6371 - Section# 13999 - Numerical Analysis - by J. He
Math 6376 - Section# 20476 - Numerical liner algebra - by R. Glowinski
Math 6378 - Section# 14000 - Basic Scientific Computing - by R. Sanders
Math 6383 - Section# 14001 - Probability Models and Mathematical Statistics - by R. Azencott
Math 6385 - Section# 14002 - Continuous-Time Models in Finance - by E. Kao

Math 6397 - Section# 20469 - Mathematical Hemodynamics - by Canic
Math 6397 - Section# 20473 - Variation analysis of PDE - by G. Auchmuty
Math 7321 - Section# 20474 - Functional analysis - by D. Labate
Math 7350 - Section# 14068 - Geometry of Manifolds - by W. Ott
Math 7374 - Section# 20477 - Finite element methods - by R. Hoppe
Math 7394 - Section# 20478 - Numerical Methods for the solution of control problems for systems modeled by partial differential equations - by R. Glowinski
Math 7397 - Section# 20475 - Monte Carlo methods in finance - by E. Kao

III. HOW TO REGISTER COURSES

1. Log in to My UH (People Soft)
2. Select "UH Self-Service"
3. Select "Enrollment"
4. Select "Enrollment: add classes" and choose the semester in which you would like to be enrolled.
5. Enter the specific section number for the class.
6. Continue to add more courses if needed and continue to finish the enrollment process.

IV. ARCHIVE OF PREVIOUS COURSES

SENIOR UNDERGRADUATE COURSES

Math 4309 Mathematical Biology (Section# 20471)

Time:	TuTh 10:00AM - 11:30AM - Room: SEC 202
Instructor:	K. Josic
Prerequisites:	A course on differential equation (equivalent to math 3321 or math 3331) and some background in probability.
Text(s):	S. Ellner and J. Guckenhemer: Dynamic Models in Biology http://press.princeton.edu/titles/8124.html
Description:	Topics in mathematical biology, epidemiology, population models, models of genetics and evolution, network theory, pattern formation, and neuroscience.

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Math 4315 Graph Theory with Applications (Section# 13937)

Time:	MoWeFr 12:00PM - 1:00PM - Room: F 154
Instructor:	S. Fajtlowicz
Prerequisites:	Discrete Mathematics
Text(s):	Lecture Note

Description: Eulerian tours with application to reconstruction of DNA sequences from fragments. Euler characteristic formula. Map coloring problems and 4-color theorem. Trivalent planar graphs with application to fullerenes - new forms of carbon. Hamiltonian tours. Ramsey Theory and Erdos's probabilistic method. Matchings and Marriage Theorem.

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Math 4332 Introduction to Real Analysis (Section# 13938)

Time:	MoWeFr 12:00PM - 1:00PM - Room: AH 15
Instructor:	M. Field
Prerequisites:	Math 4331 or equivalent
Text(s):	Notes provided by instructor.
Description:	topics covered: (a) The Euler-Maclaurin formula and applications; (b) fractals and iterated function systems; (c) calculus on n-dimensional vector spaces.

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Math 4351 Differential Geometry (Section# 20472)

Time:	MoWeFr 11:00AM - 12:00PM - Room: PGH 347
Instructor:	M. Ru
Prerequisites:	Math4350
Text(s):	Differential Geometry: A first course in curves and surfaces by Prof. Theodore Shifrin at the University of Georgia (http://www.math.uga.edu/~shifrin/ShifrinDiffGeo.pdf).
Description:	This is a continuation of the study of Differential Geometry from Math 4350. I plan to finish the rest of the chapter 3 in Prof. Theodore Shifrin's book, and cover some selected topics.

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Math 4365 Numerical Analysis (Section# 13939)

Time:	MoWe 4:00PM - 5:30PM - Room: PGH 348
Instructor:	T. Pan
Prerequisites:	- Math 2331 (Linear Algebra), Math 3331 (Differential Equations). - Ability to do computer assignments in one of FORTRAN,C, Pascal, Matlab, Maple, Mathematica, and etc.. - The first semester is not a prerequisite.
Text(s):	R. L. Burden & J. D. Faires, Numerical Analysis, 8th edition, Thomson, 2005.
Description:	We will develop and analyze numerical methods for approximating the solutions of common mathematical problems. The emphasis this semester will be on the iterative methods for solving linear systems, approximation theory, numerical solutions of nonlinear equations, iterative methods for approximating eigenvalues, and elementary methods for ordinary differential equations with boundary conditions and partial differential equations. This is an introductory course and will be a mix of mathematics and computing.

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Math 4377 Advanced Linear Algebra I (Section# 17790)

Time:	TuTh 11:30AM - 1:00PM - Room: F 154
Instructor:	A. Torok
Prerequisites:	Math 2331 and minimum 3 hours of 3000 level mathematics.
Text(s):	Linear Algebra, 4th edition, by Friedberg, Insel, and Spence, ISBN 0-13-008451-4

The course will cover Chapters 1-4 and the first two sections of Chapter 5.

Description: Topics include systems of linear equations, vector spaces and linear transformations (developed axiomatically), matrices, determinants, eigenvectors and diagonalization.

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Math 4378 Advanced Linear Algebra II (Section# 13940)

Time: MoWeFr 10:00AM - 11:00AM - Room: SW 102
Instructor: G. Heier
Prerequisites: Math 4377 (or Math 6308)
Text(s): Linear Algebra, 4th edition, by Friedberg, Insel, and Spence, ISBN 0-13-008451-4
Description: The instructor will cover Sections 5-7 of the textbook. Topics will include: Eigenvalues/Eigenvectors, Cayley-Hamilton Theorem, Inner Products and Norms, Adjoints of Linear Operators, Normal and Self-Adjoint Operators, Orthogonal and Unitary Operators, Jordan Canonical Form, Minimal Polynomials, Rational Canonical Form

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Math 4380 A Mathematical Introduction to Options (Section# 13941)

Time: TuTh 4:00PM - 5:30PM - Room: SEC 201
Instructor: I. Timofeyev
Prerequisites:
Text(s): "An Introduction to Financial Option Valuation: Mathematics, Stochastics and Computation" by Desmond Higham
Description: This course is an introduction to mathematical modeling of various financial instruments, such as options, futures, etc. The topics covered include: calls and puts, American and European options, expiry, strike price, drift and volatility, non-rigorous introduction to continuous-time stochastic processes including Wiener Process and Ito calculus, the Greeks, geometric Brownian motion, Black-Scholes theory, binomial model, martingales, filtration, and self financing strategy.

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Math 4383 Number Theory (Section# 23355)

Time: TuTh 10:00AM - 11:30AM - Room: SR 128
Instructor: J. Hardy
Prerequisites: Math 3330
Text(s): Elementary Number Theory by David M. Burton 7th Edition McGraw-Hill
Description: This course will cover the topics in the standard one semester introduction to number theory:

Divisibility theory, primes and their distribution, theory of congruences, Fermat's Little Theorem, number theoretic functions, Euler's Phi-function and Euler's Theorem, primitive roots, quadratic reciprocity, non-linear Diophantine equations, other topics if time permits.

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Math 4389 Survey of Undergraduate Mathematics (Section# 13942)

Time: MoWe 5:30PM - 7:00PM - Room: SEC 203
Instructor: G. Etgen
Prerequisites:
Text(s):
Description:

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GRADUATE ONLINE COURSES

Math 5330 Abstract algebra (Section# 16310)

Time:	Arrange (online course)
Instructor:	K. Kaiser
Prerequisites:	Acceptance into the MAM program; PB standing
Text(s):	Dan Saracino, Abstract Algebra, A first course, first or second edition
Description:	Introduction to groups, rings and fields. Additional notes will be made available on http://www.math.uh.edu/~klaus/

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Math 5332 Differential equations (Section# 13970)

Time:	Arrange (online course)
Instructor:	G. Etgen
Prerequisites:	
Text(s):	
Description:	**Remark:** **If you are a MA graduate student wanting to enroll for this course, in case the quota is full or any problem, please contact Dr. Etgen at etgen@math.uh.edu and he will help you.**

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Math 5383 Number theory (Section# 13971)

Time:	Arrange (online course)
Instructor:	M.Ru
Prerequisites:	None
Text(s):	Discovering Number Theory, by Jeffrey J. Holt and John W. Jones, W.H. Freeman and Company, New York, 2001.
Description:	Number theory is a subject that has interested people for thousand of years. This course is a one-semester long graduate course on number theory. Topics to be covered include divisibility and factorization, linear Diophantine equations, congruences, applications of congruences, solving linear congruences, primes of special forms, the Chinese Remainder Theorem, multiplicative orders, the Euler function, primitive roots, quadratic congruences, representation problems and continued fractions. There are no specific prerequisites beyond basic algebra and some ability in reading and writing mathematical proofs. The method of presentation in this course is quite different. Rather than simply presenting the material, students first work to discover many of the important concepts and theorems themselves. After reading a brief introductory material on a particular subject, students work through electronic materials that contain additional background, exercises, and Research Questions. The research questions are typically more open ended and require students to respond with a conjecture and proof. We the present the theory of the material which the students have worked on, along with the proofs. The homework problems contain both computational problems and questions requiring proofs. It is hoped that students, through this course, not only learn the material, learn how to write the proofs, but also gain valuable insight into some of the realities of mathematical research by developing the subject matter on their own.

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Math 5386 Regression and Linear Models (Section# 19126)

Time:	Arrange (online course)
Instructor:	C. Peters
Prerequisites:	Math 5385 or equivalent.

Text(s):	Introduction to Linear Regression Analysis, 4th Edition, by Douglas C. Montgomery, Elizabeth A. Peck, G. Geoffrey Vining, Wiley, 2006.
Description:	Simple and multiple linear regression, inference in multiple regression, regression diagnostics, and influence measures, model selection, generalized linear models.

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Math 5397 Complex analysis (Section# 20468)

Time:	Arrange (online course)
Instructor:	S. Ji
Prerequisites:	Math 5333 or 3333, or consent of instructor
Text(s):	No textbook. Lecture notes provided by the instructor. Any textbook on complex analysis could be helpful.
Description:	This course is an introduction to complex analysis. It will cover the theory of holomorphic functions, Cauchy theorem and Cauchy integral formula, residue theorem, harmonic and subharmonic functions, and other topics. On-line course is taught through Blackboard Vista, visit http://www.uh.edu/webct/ for information on obtaining ID and password. The course will be based on my notes. In each week, some lecture notes will be posted in Blackboard Vista, including homework assignment. Homework (60%) will be turned in by the required date through Blackboard Vista. Two exams, a midterm and a final exam, online (40%). All homework and exams must be submitted in pdf files.

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GRADUATE COURSES

Math 6303 Modern Algebra (Section# 13979)

Time:	MoWeFr 10:00AM - 11:00AM - Room: PGH 345
Instructor:	M. Tomforde
Prerequisites:	MATH 6302 or consent of instructor.
Text(s):	"Abstract Algebra" by David Dummit and Richard Foote, 3rd Edition
Description:	This is a continuation of Math 6302. It covers field theory and module theory. The field theory portion will include topics such as field extensions, Galois theory, and constructability. The module theory portion will cover free and projective modules, the structure theorem for finitely generated modules over a PID, and the basics of homological algebra.

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Math 6308 Advanced Linear Algebra I (Section# 16677)

Time:	TuTh 11:30AM - 1:00PM - Room: F 154
Instructor:	A. Torok
Prerequisites:	Math 2331 and minimum 3 hours of 3000 level mathematics.

Text(s):	Linear Algebra, 4th edition, by Friedberg, Insel, and Spence, ISBN 0-13-008451-4 The course will cover Chapters 1-4 and the first two sections of Chapter 5.
Description:	Topics include systems of linear equations, vector spaces and linear transformations (developed axiomatically), matrices, determinants, eigenvectors and diagonalization.
Remark:	There is a limitation for counting graduate credits for Math 6308, 6309, 6312, or 6313. For detailed information, see Masters Degree Options.

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Math 6309 Advanced Linear Algebra II (Section# 16678)

Time:	MoWeFr 10:00AM - 11:00AM - Room: SW 102
Instructor:	G. Heier
Prerequisites:	Math 4377 (or Math 6308)
Text(s):	Linear Algebra, 4th edition, by Friedberg, Insel, and Spence, ISBN 0-13-008451-4
Description:	The instructor will cover Sections 5-7 of the textbook. Topics will include: Eigenvalues/Eigenvectors, Cayley-Hamilton Theorem, Inner Products and Norms, Adjoints of Linear Operators, Normal and Self-Adjoint Operators, Orthogonal and Unitary Operators, Jordan Canonical Form, Minimal Polynomials, Rational Canonical Form
Remark:	There is a limitation for counting graduate credits for Math 6308, 6309, 6312, or 6313. For detailed information, see Masters Degree Options.

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Math 6313 Introduction to Real Analysis (Section# 16676)

Time:	MoWeFr 12:00PM - 1:00PM - Room: AH 15
Instructor:	M. Field
Prerequisites:	Math 4331 or equivalent
Text(s):	Notes provided by instructor.
Description:	topics covered: (a) The Euler-Maclaurin formula and applications; (b) fractals and iterated function systems; (c) calculus on n-dimensional vector spaces.
Remark:	There is a limitation for counting graduate credits for Math 6308, 6309, 6312, or 6313. For detailed information, see Masters Degree Options.

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Math 6321 Theory of Functions of a Real Variable (Section# 13997)

Time:	TuTh 2:30PM-4:00PM - Room: SEC 203
Instructor:	B. Bodmann
Prerequisites:	Math 6320 or some knowledge of integration theory (with consent of instructor). A little topology and metric spaces would be useful.
Text(s):	W. Rudin, Real and Complex Analysis, 3rd edition, McGraw-Hill, 1987.

Description:	This semester will continue to develop the basic principles of measure, integration, and real analysis. This material is essential to many parts of mathematics (in particular to analysis and probability). We will cover the following topics: • Banach and Hilbert spaces • Signed and complex measures. • The Radon-Nikodym theorem. • The duality of $\mathbf{L^p}$ spaces. • Differentiation and integration of measures and functions on $\mathbf{R^n}$. • Product spaces. • Convolutions. • The Fourier transform.

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Math 6325 Differential Equations II (Section# 20470)

Time:	TuTh 10:00AM - 11:30AM - Room: PGH 350
Instructor:	M. Nicol
Prerequisites:	math 6324 or consent of instructor
Text(s):	These following books are recommended but purchase of them is not required as lecture notes will be comprehensive. 1. Mathematics Methods of Classical Mechanics, by V. I. Arnold, Springer Verlag, 2nd edition. 2. Classical Mechanics, by H. Goldstein, Addison Wesley, 2nd edition.
Description:	This course is an introduction to applications of mathematics (in the guise of differential equations theory) to the natural sciences, in particular classical mechanics. Topics covered include Newtonian mechanics (energy, momentum, planetary motion), Lagrangian and Hamiltonian mechanics and Hamilton-Jacobi theory. Applications will include special relativity, fluid dynamics, wave mechanics and rigid body motion. Along the way topics such as differential forms, manifolds, Lie groups and Lie algebras, symplectic geometry, dynamical systems and ergodic theory will be naturally introduced.

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Math 6361 Applicable Analysis - by Y. Gorb (Section# 16687)

Time:	TuTh 4:00PM - 5:30PM - Room: PGH 350
Instructor:	Y. Gorb
Prerequisites:	MATH 6360 or equivalent or consent of instructor.
Text(s):	L.D. Berkowitz, Convexity and Optimization in Rn , Wiley Interscience, 2002.
Description:	This course will cover theoretical topics in finite dimensional optimization theory. An introduction to the theory of convex sets and functions, convex constrained optimization, conjugate functions and duality will be given, and linear eigenvalue problems will be studied. Both unconstrained and constrained optimization problems will be handled, and basic applications are considered.

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Math 6367 Optimization and Variational Methods (Section# 13998)

Time:	TuTh 10:00AM - 11:30AM - Room: PGH 345
Instructor:	Z. Zhang
Prerequisites:	MATH 6366 or consent of the instructor
Text(s):	Dynamic Programming and Optimal Control, by Dimitri P. Bertsekas, Vol. I, 3rd Edition, Athena Scientific, ISBN: 1-886529-26-4, not required

Description:	This is the second semester class of optimization theory and will also be an introduction to the modern control theory of dynamic systems. Both dynamic programming and calculus of variations will be covered. The course consists of two parts. In the first part, typical results for deterministic systems, including both continuous-time and discrete-time systems, will be introduced. In the second part, we will work on stochastic systems. Problems with stochastic uncertainty will be discussed, including discrete-time Markovian decision problems, popular in operations research.

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Math 6371 Numerical Analysis (Section# 13999)

Time:	TuTh 1:00PM - 2:30PM - Room: AH 202
Instructor:	J. He
Prerequisites:	This is the second semester of a two semester course. The first semester is not a prerequisite, but familiarity with numerical solution of linear system is assumed. Familiarity with Matlab is also required
Text(s):	1. Numerical Methods in Scientific Computing, Volume 1 Society for Industrial Mathematics (September 4, 2008) Germund Dahlquist, Ake Bjorck ISBN 978-0-898716-44-3 2. A First Course in the Numerical Analysis of Differential Equations, 2nd Edition Cambridge University Press; 2nd edition (December 29, 2008) Arieh Iserles ISBN 978-0-521734-90-5
Description:	This is the second semester of a two semester course. The focus in this semester is on approximation theory and numerical analysis of both ordinary and partial differential equations. The applications of approximation theory to interpolation, Fourier analysis, numerical differentiation and Gaussian integration will be addressed. The concepts of consistency, convergence, stability for the numerical solution of ODEs will be discussed. Other topics covered include multistep and Runge-Kutta methods; finite difference and finite elements techniques for the Poisson equation; and a variety of algorithms to solve large, sparse algebraic systems.

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Math 6376 Numerical liner algebra (Section# 20476)

Time:	MoWe 1:00PM - 2:30PM - Room: PGH 350
Instructor:	R. Glowinski
Prerequisites:	Senior Undergraduate Courses on Advanced Linear Algebra and Numerical Analysis are recommended
Text(s):	G.H.Golub and C.F.Van Loan,Matrix Computations
Description:	In this course,we consider the basic numerical methods for the numerical solution of linear algebraic systems and eigenvalue problems with symmetric and non-symmetric matrices. The list of methods includes LU and QR factorization algorithms,relaxation and GMRES methods for solving algebraic systems as well as QR algorithm and the Lanczos method for solving eigenvalue problems.We also will consider numerical methods for the least square and constrained minimization problems which results in algebraic systems with saddle-point matrices. The methods and algorithms will be illustrated by examples from advanced practical applications.

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Math 6378 Basic Scientific Computing (Section# 14000)

Time:	TuTh 5:30PM - 7:00PM - Room: PGH 348
Instructor:	R. Sanders
Prerequisites:	Elementary Numerical Analysis. Knowledge of C and/or Fortran. Graduate standing or consent of instructor.
Text(s):	Lecture note

Description:	Fundamental techniques in high performance scientific computation. Hardware architecture and floating point performance. Pointers and dynamic memory allocation. Data structures and storage techniques related to numerical algorithms. Parallel programming techniques. Code design. Applications to numerical algorithms for the solution of systems of equations, differential equations and optimization. Data visualization. This course also provides an introduction to computer programming issues and techniques related to large scale numerical computation.

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Math 6383 Probability Models and Mathematical Statistics (Section# 14001)

Time:	TuTh 4:00PM - 5:30PM - Room: PGH 345
Instructor:	R. Azencott
Prerequisites:	undergraduate probability + basic knowledge of "Matlab"or "R" or other scientific programming language
Text(s):	Required reading will be extracted from Statistics.(by David Freemann, Robert Pisani, Roger Purves)2007.
Description:	COURSE OBJECTIVES: Upon completion of the course, students will havelearned key results and mathematical principles for the use of parametricmodels in applied statistics. Two applied projects will involve basiccomputer implementations of statistical techniques COURSE CONTENT: descriptive statistics, statistical sampling and estimation, exponentialfamilies and sufficient statistics, maximum likelihood estimators,confidence intervals and hypothesis testing, regression and linear models multiple examples of applied statistics (see textbook) COURSE REQUIREMENTS: A. written homework assignments + computer implementation of basicstatistical techniques B. Exams: There will be a midterm exam and a final exam. EVALUATION AND GRADING: Semester grades will be based on a weightedaverage of homework +projects average, midterm exam grade, and final exam grade. letter grades correspond to the standard scale: 90-100 for an A, 80-89 for a B, etc. Pluses and minuses will be attached if your average is within two points of the dividing line between one letter and another. Forexample, a grade of 88 is a B+; a grade of 81 is a B-.

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Math 6385 Continuous-Time Models in Finance (Section# 14002)

Time:	TuTh 5:30PM - 7:00PM - Room: PGH 347
Instructor:	E. Kao
Prerequisites:	MATH 6382 and 6383
Text(s):	Arbitrage Theory in Continuous Time, 3nd edition, by Thomas Bjork, Oxford Univerisity Press, 2009.
Description:	This course is an introduction to continuous-time models in finance. We first cover tools for pricing contingency claims. They include stochastic calculus, change of measures, and martingale representation theorem. We then apply these ideas in pricing financial derivatives whose underlying assets are equities, foreign exchanges, and fix income securities. In addition, we will study the single-factor and multi-factor HJM models, and models involving jump diffusion and mean reversion.

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Math 6397 Mathematical Hemodynamics (Section# 20469)

Time:	MoWe 4:00PM - 5:30PM - Room: PGH 345
Instructor:	S. Canic
Prerequisites:	
Text(s):	
Description:	

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Math 6397 Variation analysis of PDE (Section# 20473)

Time:	TuTh 2:30PM - 4:00PM - Room: SR 138
Instructor:	G. Auchmuty
Prerequisites:	M6321 or permission of the instructor
Text(s):	no required text
Description:	This course will treat variational methods for elliptic and parabolic partial differential equations. It is a continuation of M6397 from the fall semester. The topics will center on the existence and properties of minimizers of convex functionals on Sobolev spaces. Topics will include principles for second order elliptic boundary and eigenvalue problems and also parabolic initial value problems in bounded regions. Some material from convex analysis and the theory of min-max problems will also be described.

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Math 7321 Functional analysis (Section# 20474)

Time:	MoWe 1:00PM - 2:30PM - Room: SR 140
Instructor:	D. Labate
Prerequisites:	Math 7320
Text(s):	Kreyszig "Introductory Functional analysis with Applications" (same as first semester)
Description:	This is the second part of the Functional Analysis sequence. The course covers the Spectral Theory for Compact and self-Adjoint operators, Unbounded Linear Operators in Hilbert Spaces, some applications from Harmonic Analysis and Mathematical physics (e.g., Pseudodifferential operators, Radon transform). Additional problems/applications may be identified according to the input from students.

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Math 7350 Geometry of Manifolds (Section# 14068)

Time:	TuTh 1:00PM - 2:30PM - Room: F 162
Instructor:	W. Ott
Prerequisites:	
Text(s):	
Description:	

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Math 7374 Finite element methods (Section# 20477)

Time:	MoWeFr 12:00PM - 1:00PM - Room: PGH 345
Instructor:	R. Hoppe
Prerequisites:	Calculus, Linear Algebra, Numer. Math. I
Text(s):	Finite Element Methods. 3rd Edition. Springer, New York, 2008
Description:	Finite Element Methods are widely used discretization techniques for the numerical solution of PDEs based on appropriate variational formulations. We begin with basic principles for the construction of Conforming Finite Elements and Finite Element Spaces with respect to triangulations of the computational domain. Then, we study in detail a priori estimates for the global discretization error in various norms of the underlying function space. Nonconforming and Mixed Finite Element Methods will be addressed as well. A further important issue is adaptive grid refinement on the basis of efficient and reliable a posteriori error estimators for the global discretization error.

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Math 7394 Numerical Methods for the solution of control problems for systems modeled by partial differential equations (Section# 20478)

***** this course is "canceled" *****

Time:	TuTh 11:30AM - 1:00PM - Room: AH 301
Instructor:	R. Glowinski
Prerequisites:	Linear Algebra, Linear Partial Differential Equations, Finite Difference Methods
Text(s):	R. Glowinski, J.L. Lions, J. He, Exact and Approximate Controllability for Distributed Parameter Systems, Cambridge University Press, Cambridge, UK, 2008
Description:	The control of systems modeled by partial differential equations has been an important topic for many years already, the main reason being its applicability to real life situations. The main goal of this course is to introduce the students to this subject by considering first the linear control of linear advection-reaction-diffusion models. The numerical solution of such problems will be extensively detailed (optimality conditions, approximation, iterative solution,…). Next, the above methodology will be generalized in order to solve bilinear control problems; quantum control has made bilinear control a popular topic these days, but such problems can be found also in flow control.

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Math 7397 Monte Carlo methods in finance (Section# 20475)

Time:	TuTh 2:30PM - 4:00PM - Room: PGH 350
Instructor:	E. Kao
Prerequisites:	MATH 6382 and 6383
Text(s):	Monte Carlo Methods in Financial Engineering, by Paul Glasserman, Springer, 2004.
Description:	This course is an introduction to Monte-Carlo Methods in finance. Topics include generating of random samples and sample paths, various reduction techniques, statistical analysis of simulation experiments, quasi-Monte Carlo, sensitivity analysis, and applications of Monte-Carlo methods in valuation of financial derivatives and risk management.