Class Schedule - Summer 2005

Mathematics
Mathematics
Chairperson of Department: Daniel Grayson
Department Office: 273 Altgeld Hall, 1409 West Green, Urbana
Phone: 333-3350
www.math.uiuc.edu

MATH 012  *Algebra* credit: 3 hours.
(MATH 112) Rapid review of basic techniques of factoring, rational expressions, equations and inequalities; functions and graphs; exponential and logarithm functions; systems of equations; matrices and determinants; polynomials; and the binomial theorem. Students who need both algebra and trigonometry should enroll in MATH 016. Credit is not given for both MATH 012 and MATH 016. Credit not applicable toward graduation in certain curricula. Prerequisite: 1.5 units of high school algebra, and 1 unit of high school geometry.

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MATH 118  *Numeracy* credit: 3 hours.
(MATH 118) Elementary course for students whose major interests are not in engineering or the physical sciences; emphasizes understanding of mathematical aspects of modern, real-world problems; includes concepts from combinatorics, exponential growth, probability and statistics; problem-solving strategies. Prerequisite: Two units of high school algebra, and one unit of high school geometry.

This course satisfies the General Education Criteria for a: Quantitative Reasoning I

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Quant Reasoning I course.

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Quant Reasoning I course.

MATH 124  *Finite Mathematics* credit: 3 hours.
MATH 124 Introduction to finite mathematics for students in the social sciences; introduces the student to the basic ideas of logic, set theory, probability, vectors and matrices, and Markov chains. Problems are selected from social sciences and business. Prerequisite: MATH 012, or an adequate ACT score.

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Quantitative Reasoning I

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Quant Reasoning I course.

MATH 125 Elementary Linear Algebra credit: 3 hours.

(MATH 125) Basic concepts and techniques of linear algebra; includes systems of linear equations, matrices, determinants, vectors in n-space, and eigenvectors, together with selected applications, such as Markov processes, linear programming, economic models, least squares, and population growth. Credit is not given for both MATH 125 and MATH 225. Prerequisite: MATH 012, or an adequate ACT score.

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MATH 161 Statistics credit: 3 hours.

(MATH 161) Same as STAT 100. See STAT 100.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

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Quant Reasoning I course.

MATH 199  **Undergraduate Open Seminar**  credit: 1 TO 5 hours.
(MATH 199) Approved for both letter and S/U grading. May be repeated.

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MATH 213  **Basic Discrete Mathematics**  credit: 3 hours.
(MATH 213) Beginning course on discrete mathematics, including sets and relations, functions, basic counting techniques, recurrence relations, graphs and trees, and matrix algebra; emphasis throughout is on algorithms and their efficacy. Credit is not given for both MATH 213 and CS 173. Prerequisite: MATH 220 or equivalent.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Quant Reasoning II course.

MATH 220  **Calculus I**  credit: 5 hours.
(MATH 120) First course in calculus and analytic geometry; basic techniques of differentiation and integration with applications including curve sketching; antidifferentation, the Riemann integral, fundamental theorem, exponential and circular functions. Credit is not given for both MATH 220 and MATH 234. Prerequisite: MATH 016 or equivalent; or an adequate ACT score.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning I

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Quant Reasoning I course.

MATH 225  **Introductory Matrix Theory**  credit: 2 hours.
(MATH 225) Systems of linear equations, matrices and inverses, determinants, and a glimpse at vector spaces, eigenvalues and eigenvectors. Credit is not given for both MATH 225 and either MATH 125 or MATH 415. Prerequisite: MATH 220 or equivalent.

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MATH 230  Calculus II  credit: 3 hours.
(MATH 130) Second course in calculus and analytic geometry: techniques of integration, conic sections, polar coordinates, and infinite series. Prerequisite: MATH 220.

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Quant Reasoning I course.

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Quant Reasoning I course.

MATH 234  Calculus for Business I  credit: 4 hours.
(MATH 134) Introduction to the concept of functions and the basic ideas of the calculus. Credit is not given for both MATH 234 and MATH 220. Prerequisite: MATH 012.

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Quant Reasoning I course.

MATH 242  Calculus of Several Variables  credit: 3 hours.
Third course in calculus and analytic geometry: three dimensional space, functions of several variables, partial derivatives, and multiple integrals. Credit is not given for both MATH 242 and MATH 243. Prerequisite: MATH 230.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Quant Reasoning II course.
### MATH 380  **Advanced Calculus**  credit: 3 hours.

(MATH 280) Introductory study of vector calculus and functions of several variables; topics include directional derivatives; Jacobians; change of variables in multiple integrals; maxima and minima; line and surface integrals; theorems of Gauss, Green, and Stokes; infinite series; and uniform convergence. Prerequisite: MATH 242 or MATH 243, or equivalent.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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### MATH 385  **Intro Differential Equations**  credit: 3 hours.

(MATH 285) Intended for engineering students and others who require a working knowledge of differential equations; included are techniques and applications of ordinary differential equations and an introduction to partial differential equations. Credit is not given for both MATH 385 and either MATH 386 or MATH 441. Prerequisite: MATH 242 or MATH 243, or equivalent.

This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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### MATH 390  **Individual Study**  credit: 0 TO 3 hours.

(MATH 290) Guided individual study of advanced topics not covered in other courses. May be repeated to a maximum of 8 hours. Prerequisite: Consent of instructor.
### MATH 415  Linear Algebra  credit: 3 OR 4 hours.

(MATH 315) Introductory course emphasizing techniques of linear algebra; topics include matrix operations, determinants, linear equations, vector spaces, linear transformations, eigenvalues, and eigenvectors. 3 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Credit not given for both MATH 225 and either MATH 125 or MATH 415. Prerequisite: MATH 242 or MATH 243.

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Quantitative Reasoning II

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Credit Hours: 3 hours
Quant Reasoning II course.
Meets 13-Jun-05 - 04-Aug-05.

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Credit Hours: 4 hours
Quant Reasoning II course.
Meets 13-Jun-05 - 04-Aug-05.

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Credit Hours: 3 hours
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Online Quant Reasoning II course.
Restricted to MCS:Computer Sci Online -UIUC, MS:Electrical Engineering -UIUC, MS:Mechanical Engineering -UIUC, or NDEG:Grad Nondegree-CE-UIUC.
Meets 16-May-05 - 04-Aug-05.
Academic Outreach restrictions and assessments apply, see http://www.outreach.uiuc.edu; Please see http://online. engr.uiuc.edu/ descriptions/summer2005.htm for more details on this course.
Graduate - Urbana-Champaign OCE Tuition $608.00 per Bill Hour, Undergrad - Urbana-Champaign OCE Tuition $608.00 per Bill Hour, Graduate - Urbana-Champaign OCE Fees $36.00 per Bill Hour, and Undergrad - Urbana-Champaign OCE Fees $36.00 per Bill Hour.

MATH 417 Intro to Abstract Algebra credit: 3 OR 4 hours.
(MATH 317) Fundamental theorem of arithmetic. Congruencies, groups and group actions, Polya counting, rings, fields, and roots of polynomials. Emphasizes proofs. 3 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Prerequisite: MATH 415 and either MATH 347 or MATH 348; or consent of instructor.
This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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</table>

Credit Hours: 3 hours
Quant Reasoning II course.

MATH 444 Elementary Real Analysis credit: 3 OR 4 hours.
(MATH 344) Careful treatment of the theoretical aspects of the calculus of functions of a real variable; topics include the real number system, limits, continuity, derivatives, and the Riemann integral. 3 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Credit is not given for both MATH 444 and MATH 447. Prerequisite: MATH 242 or MATH 243; MATH 347 or MATH 348 or equivalent experience.
This course satisfies the General Education Criteria for a:
Quantitative Reasoning II

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Credit Hours: 3 hours
Quant Reasoning II course.
### MATH 446  Applied Complex Variables  credit: 3 OR 4 hours.
(MATH 346) For students who desire a working knowledge of complex variables; covers the standard topics and gives an introduction to integration by residues, the argument principle, conformal maps, and potential fields. Students desiring a systematic development of the foundations of the subject should take MATH 448. 3 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Credit is not given for both MATH 446 and MATH 448. Prerequisite: MATH 243 or MATH 380 or consent of instructor.

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Credit Hours: 3 hours

### MATH 450  Intro to Numerical Analysis  credit: 3 OR 4 hours.
(MATH 350) Same as CS 450, CSE 401, and ECE 491. See CS 450.

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Credit Hours: 4 hours
MATH 461  **Probability Theory I**  credit: 3 OR 4 hours.
(MATH 361) Introduction to mathematical probability; includes the calculus of probability, combinatorial analysis, random variables, expectation, distribution functions, moment-generating functions, and central limit theorem. Prepares students for MATH 466. Same as STAT 451. 3 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Prerequisite: MATH 242 or MATH 243, or equivalent.

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Credit Hours: 3 hours
Meets 13-Jun-05 - 04-Aug-05.

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Credit Hours: 4 hours
Meets 13-Jun-05 - 04-Aug-05.

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Online
Restricted to MCS:Computer Sci Online -UIUC, MS:Electrical Engineer -UIUC, MS:Mechanical Engineer -UIUC, or NDEG:Grad Nondegree-CE-Ullic.
Meets 16-May-05 - 04-Aug-05.
Academic Outreach restrictions and assessments apply, see http://www.outreach.uiuc.edu; Please see http://online.engr.uiuc.edu/ descriptions/summer2005.htm for more details on this course.
Graduate - Urbana-Champaign OCE Tuition $608.00 per Bill Hour, Undergrad - Urbana-Champaign OCE Tuition $608.00 per Bill Hour, Graduate - Urbana-Champaign OCE Fees $36.00 per Bill Hour, and Undergrad - Urbana-Champaign OCE Fees $36.00 per Bill Hour.

MATH 463  **Statistics and Probability I**  credit: 4 hours.
(MATH 363) Same as STAT 400. See STAT 400.
MATH 488  **Math Methods In Engineering**  credit: 3 OR 4 hours.
Matrices, determinants, bounds and approximations to eigenvalues, introduction to linear operator theory and inner product spaces, orthogonal expansions, and Fourier transforms. 3 undergraduate hours. 3 or 4 graduate hours. 4 hours of credit requires approval of the instructor and completion of additional work of substance. Prerequisite: MATH 380 or equivalent.

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Credit Hours: 4 hours
Academic Outreach restrictions and assessments apply, see http://www.outreach.uiuc.edu; Please see http://online.engr.uiuc.edu/descriptions/summer2005.htm for more details on this course.

MATH 490  **Topics in Mathematics**  credit: 1 TO 4 hours.
(MATH 351) Deals with topics in the application of mathematics to the physical, biological, and social sciences; see Class Schedule or department office for current topics. May be repeated with approval. Prerequisite: Consent of instructor.

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Credit Hours: 3 hours
Calculus Refresher
Academic Outreach restrictions and assessments apply, see http://www.outreach.uiuc.edu; Please see http://online.engr.uiuc.edu/descriptions/summer2005.htm for more details on this course.

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Credit Hours: 1 hours
Systems of Linear Differ Equat
Academic Outreach restrictions and assessments apply, see http://www.outreach.uiuc.edu; Please see http://online.engr.uiuc.edu/descriptions/summer2005.htm for more details on this course.

MATH 553  **Partial Differential Equations**  credit: 4 hours.
(MATH 444) Basic introduction to the study of partial differential equations; topics include: the Cauchy problem, power-series methods, characteristics, classification, canonical forms, well-posed problems, Riemann's method for hyperbolic equations, the Goursat problem, the wave equation, Sturm-Liouville problems and separation of variables, Fourier series, the heat equation, integral transforms, Laplace's equation, harmonic functions, potential theory, the Dirichlet and Neumann problems, and Green's functions. Prerequisite: Consent of instructor.

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### MATH 595  **Advanced Topics in Math**  credit: 4 hours.
Prerequisite: Consent of instructor.

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### MATH 597  **Reading Course**  credit: 1 TO 8 hours.
(MATH 490) May be repeated in the same or separate terms to a maximum of 8 hours. Prerequisite: Consent of instructor

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### MATH 598  **Literature Seminar in Math**  credit: 0 TO 4 hours.
(MATH 491) Seminar on topics of current interest in mathematics. Students present seminars and discussions on various topics. See Class Schedule for current topics. Recommended for all Mathematics students. Prerequisite: Consent of instructor.

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### MATH 599  **Thesis Research**  credit: 0 TO 16 hours.
(MATH 499) May be repeated. Approved for S/U grading only. Prerequisite: Consent of instructor.

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