MATHEMATICS (MATH)

Subject-area course lists indicate courses currently active for offering at the University of Louisville. Not all courses are scheduled in any given academic term. For class offerings in a specific semester, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm).

500-level courses generally are included in both the undergraduate- and graduate-level course listings; however, specific course/section offerings may vary between semesters. Students are responsible for ensuring that they enroll in courses that are applicable to their particular academic programs.

Course Fees

Some courses may carry fees beyond the standard tuition costs to cover additional support or materials. Program-, subject- and course-specific fee information can be found on the Office of the Bursar website (http://louisville.edu/bursar/tuitionfee/).

MATH 105. Quantitative Reasoning - QR **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Appropriate placement score or equivalent coursework.
Description: Use of mathematical modeling to solve practical problems. Applications include management science, social choice, population growth, and personal finance.
Note: Does not count toward mathematics major or minor.
Note: Intended for non-science majors.
Note: Previously offered as "Contemporary Mathematics".

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 106. Applied Mathematics for Understanding Science and Evolution - S, QR **4 Units**
Term Typically Offered: Fall Only
Prerequisite(s): Appropriate placement score or equivalent coursework.
Description: Any understanding of human evolution requires knowing how each fact is supported by verifiable data, and mathematics is a primary tool for any scientific investigation of the evolution of human variation. This class will develop and apply mathematical techniques and models used to investigate and describe the distribution of human biological variation.
Note: Cross-listed with ANTH 111.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 107. Finite Mathematics **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Appropriate placement score or equivalent coursework.
Description: Systems of linear equations and inequalities, algebra of sets, counting and probability theory, vectors and matrices, and applications.
Note: Does not count toward mathematics major or minor.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 109. Elementary Statistics - QR **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): Appropriate placement score or equivalent coursework.
Description: Descriptive statistics, normal and binomial distributions, inferential statistics, contingency tables, correlation and regression, computer laboratory.
Note: Does not count toward mathematics major or minor.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 111. College Algebra - QR **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Appropriate placement score or equivalent coursework.
Fee: An additional $93.50 is charged for this course.
Description: Advanced topics in algebraic and rational expressions and factoring; polynomial, rational, exponential, and logarithmic functions; applications.
Note: Does not count toward mathematics major or minor.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 112. Trigonometry **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Appropriate placement score or equivalent coursework.
Description: Trigonometric functions through angular and circular definitions. Identities, graphing, inverse trigonometric functions, analytic geometry, applications.
Note: Does not count toward mathematics major or minor.
Note: Credit not allowed for both MATH 112 and MATH 190 or ENGR 190.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 151. Mathematics for Elementary Education I **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Appropriate mathematics placement.
Description: Problem solving and number systems, including numeration systems, integers, rational, and real numbers, and elementary number theory.
Note: Recommended only for majors in elementary or middle grades education.
Note: Does not count towards mathematics major or minor.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 152. Mathematics for Elementary Education II **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): MATH 151.
Description: Geometry, patterns, elementary statistics, discrete probability and counting.
Note: Recommended only for majors in elementary or middle grades education.
Note: Does not count towards mathematics major or minor.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 180. Elements of Calculus - QR **3 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Appropriate placement score or equivalent coursework.
Description: Differential and integral calculus of polynomial, logarithmic, and exponential functions with applications.
Note: Does not count toward mathematics major or minor.
Note: Credit not granted for both MATH 180 and MATH 205.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 190. Precalculus - QR **4 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): Appropriate placement score or equivalent coursework.
Fee: An additional $97.25 is charged for this course.
Description: Advanced topics in algebraic and rational expressions, factoring, exponents, and radicals; theory of equations and inequalities; functions. Analytic geometry, trigonometry.
Note: Does not count toward mathematics major.
Note: Credit not allowed for both MATH 190 and ENGR 190.
Note: MATH 190 normally prepares student for MATH 205.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 205. Calculus I - QR **4 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): MATH 111-MATH 112, or MATH 190, or ENGR 190, or appropriate placement score.
Fee: An additional $120.75 is charged for this course.
Description: A first course in differential and integral calculus of single variable functions.
Note: Credit will not be granted for both MATH 205 and either MATH 180 or ENGR 101.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 206. Calculus II **4 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): MATH 205 or ENGR 101.
Description: Continuation of MATH 205; Introduction to infinite series.
Note: Credit will not be granted for both MATH 206 and ENGR 102.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 301. Calculus III **4 Units**
Term Typically Offered: Fall, Spring, Summer
Prerequisite(s): MATH 206 or ENGR 102.
Description: Differential and integral calculus of functions of several variables, vector analysis, solid analytic geometry, introduction to topics in differential equations.
Note: Credit will not be granted for both MATH 301 and ENGR 201.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 311. Introduction to Higher Math **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): MATH 205 or ENGR 101.
Description: Introduction to abstract mathematics with particular attention to developing proof-reading and proof-writing skills. The basics of set theory, functions, relations, number systems, countability, sequences and their convergence, and the complex plane.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 325. Introduction to Linear Algebra **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): MATH 180 or MATH 205 or ENGR 101.
Description: Systems of equations, matrix algebra, linear independence, n-dimensional vector spaces, linear transformations, eigenvalues and eigenvectors.
Note: Credit will not be granted for both MATH 325 and ENGR 330.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 349. Statistics and Probability for Teachers **3 Units**
Prerequisite(s): Completion of general education mathematics requirement.
Description: Descriptive statistics, data analysis and collection, probability and expected value, introduction to statistical inference. Intended for prospective elementary and middle school teachers.
Note: Does not count toward major or minor in mathematics.
Note: Students may not receive credit for both this course and any of the following: MATH 109, MGMT 201, SOC 301, PSYC 312, PSYC 316 and PSYC 317, CJ 326.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 350. Geometric Investigations **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): MATH 112 or MATH 190 or MATH 205 or ENGR 101.
Description: Inductive and deductive investigation of Euclidean geometry, constructions, and transformations. Manipulative, models, and technology used in laboratory setting. Intended for prospective middle school teachers.
Note: Does not count toward major or minor in Mathematics.
Note: Credit will not be given for both MATH 350 and either MATH 550 or MATH 551.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 360. Statistical Data Analysis - WR **3 Units**
Prerequisite(s): MATH 205 or ENGR 101.
Fee: An additional $60.00 is charged for this course.
Description: Descriptive techniques, inferential techniques, simple and multiple linear regression. Frequent use of statistical computer packages. No previous knowledge of the computer required.
Note: Credit may be applied towards the MAT but not toward any other graduate degree in mathematics.
Note: Approved for the Arts and Sciences upper-level requirement in written communication (WR).

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 372. Theory of Interest **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): MATH 206 or ENGR 102.
Description: Accumulation function and the special cases of simple and compound interest. Nominal and effective interest and discount rates and the force of interest - constant and varying. Valuation of discrete and continuous streams of payments. Determination of yield rates on investments. Application of interest theory to amortization of lump sums, fixed income securities, depreciation mortgages. Covers the interest theory portion of the Examination 2 of the Society of Actuaries and the Casualty Actuarial Society.
Note: Previously offered as MATH 572 (through fall 2018).

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 387. Discrete Mathematics **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): MATH 206 or ENGR 102; MATH 325.
Description: Topics may include: Pigeon-hole principle, counting techniques, binomial coefficients, generating functions, stirling and catalan numbers, permutations and graphs.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 405. Differential Equations **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): MATH 206 or ENGR 102; MATH 325.
Description: Methods of solution of common types of ordinary differential equations.
Note: Credit will not be granted for both MATH 405 and ENGR 205.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 407. Numerical Analysis **3 Units**
Term Typically Offered: Occasionally Offered
Prerequisite(s): MATH 301 and MATH 325; MATH 405 recommended.
Description: Introduction to numerical methods used to approximate equation solutions, functions, integrals, derivatives, and solutions of ordinary differential equations.
Note: Credit will not be granted for both MATH 407 and ENGR 307.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 430. Practicum in Mathematics Education **1 Unit**
Term Typically Offered: Fall, Spring
Prerequisite(s): Selected for Math UTA; grade of B or better in MATH 311 & MATH 325; 3.0 GPA in major; 9 hrs completed in Math major at UofL.
Description: For Mathematics Undergraduate Teaching Assistants (UTAs) who have been selected to participate in the NSF-STEP-funded PRIMES project as peer mentors and undergraduate teaching assistants (UTA) in undergraduate Mathematics courses. This practicum course is intended to provide a pedagogical foundation for successfully engaging with students in the classes to which each UTA is assigned.
Note: May be repeated for a maximum total of 3 credit hours.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 451. Problem Solving in Number Systems and Discrete Mathematics **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): MATH 151; MATH 180 or MATH 205 or ENGR 101.
Description: Exploration of problem solving techniques and their application to problems in number systems and discrete mathematics. Intended for prospective middle school teachers.
Note: Does not count toward major or minor in mathematics.
Note: Credit will not be given for both MATH 451 and MATH 311.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 491. Independent Study **1-3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): Minimum grade point average of 3.0 overall; minimum grade point average of 3.5 in the department, and at least 18 semester hours credit in the department.
Description: Opportunity for students to explore, with the guidance of faculty, one or more topics in Mathematics that are not covered under the regularly offered curriculum.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 493. Cooperative Internship in Mathematics **1-3 Units**
Term Typically Offered: Occasionally Offered
Prerequisite(s): 15 hours of Mathematics (MATH 205 and above); approval of department chair; and Junior standing.
Description: An individually-arranged course combining work experience with a related academic project.
Note: BS students may apply a maximum of 3 hours in applications area requirement.
Course Attribute(s): CBL - This course includes Community-Based Learning (CBL). Students will engage in a community experience or project with an external partner in order to enhance understanding and application of academic content.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 499. Senior Honors Thesis - WR **3 Units**
Term Typically Offered: Occasionally Offered
Prerequisite(s): Senior standing and faculty consent.
Description: Independent investigation of a topic in mathematics, undertaken by a student with faculty supervision, culminating in a paper submitted for Honors.
Note: Approved for the Arts and Sciences upper-level requirement in written communication (WR).

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 501. Introduction to Analysis I - CUE **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): MATH 301, MATH 311 and MATH 325.
Description: Foundations of the real number system, sequences and series, topology of the line, continuity, differentiation of functions of one variable.
Course Attribute(s): CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 502. Introduction to Analysis II **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): MATH 501.
Description: Riemann integration on the line, sequences and series of functions, uniform convergence, metric spaces.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 505. Introduction to Partial Differential Equations **3 Units**
Term Typically Offered: Fall, Summer
Prerequisite(s): MATH 301 and MATH 405 or PHYS 350.
Description: Techniques for solving standard heat, wave, and potential equations, including discussion of Fourier analysis techniques.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 507. Fourier Analysis **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): MATH 301 and MATH 405.
Description: Introduction to Fourier series and transforms.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 511. Complex Analysis I **3 Units**
Term Typically Offered: Occasionally Offered
Prerequisite(s): MATH 301 or ENGR 201; MATH 311; MATH 325 or ENGR 330.
Description: Geometry of the complex plane,analytic and meromorphic functions, linear fractional transformations. Cauchy's Theorem and the Residue Theorem. Emphasizes computational aspects of the course topics.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 512. Complex Analysis II **3 Units**
Prerequisite(s): MATH 511.
Description: A continuation of MATH 511, including deeper properties of analytic, meromorphic, harmonic functions and conformal mappings. Emphasizes theoretical aspects of the course topics.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 520. Theory of Numbers **3 Units**
Prerequisite(s): MATH 206 or ENGR 102; MATH 311; MATH 325 or consent of instructor.
Description: A study of the integers and their divisibility properties. Particular emphasis on the theory of congruencies, partitions, prime numbers, Diophantine analysis and quadratic residues.
Note: Credit may be applied towards the MAT but not toward any other graduate degree in mathematics.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 521. Modern Algebra I - CUE **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): MATH 206 or ENGR 102; and MATH 311; and MATH 325; or consent of instructor.
Description: An introduction to the theory of groups, rings, integral domains, and fields.
Course Attribute(s): CUE - This course fulfills the Culminating Undergraduate Experience (CUE) requirement for certain degree programs. CUE courses are advanced-level courses intended for majors with at least 90 earned credits/senior-level status.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 522. Modern Algebra II **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): MATH 521.
Description: Continuation in greater depth of topics introduced in MATH 521; introduction to theory of ideals, field extensions, and abstract vector spaces.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 535. Modeling I **3 Units**
Prerequisite(s): MATH 325 or MATH 405 or equivalent.
Description: Introduction to mathematical modeling of discrete and continuous dynamical systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 536. Modeling II **3 Units**
Prerequisite(s): MATH 535.
Description: Advanced mathematical modeling of discrete and continuous dynamical systems.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 545. Introduction to Fractal Geometry **3 Units**
Prerequisite(s): MATH 301 and MATH 325; MATH 501 recommended.
Description: Recursively defined sets and self-similarity; metric spaces and iterated function systems; topological, fractal, and Hausdorff dimensions.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 550. Advanced Euclidean Geometry **3 Units**
Term Typically Offered: Occasionally Offered
Prerequisite(s): A year of high school geometry; MATH 206 or ENGR 102; MATH 311; MATH 325 or consent of instructor.
Description: Theory of Euclidean geometry contrasted with non-Euclidean from both the axiomatic and algebraic approach. Of special value to secondary teachers.
Note: Credit may be applied toward the MAT but not toward any other graduate degree in mathematics.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 551. Geometry **3 Units**
Term Typically Offered: Spring Only
Prerequisite(s): MATH 206 or ENGR 102; MATH 311; MATH 325 or consent of instructor.
Description: Study of projective spaces, transformations and invariants. Introduction to related geometries, such as affine, elliptic, and hyperbolic.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 561. Probability **3 Units**
Term Typically Offered: Fall, Spring
Prerequisite(s): MATH 301.
Description: Probability spaces, probability distributions, moments, moment-generating functions, independence, transformation of variables, sampling distributions, laws of large numbers, central limit theorem, applications.
Note: Credit will not be granted for both MATH 561 and IE 360.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 562. Mathematical Statistics **3 Units**
Prerequisite(s): MATH 561.
Description: Random samples and statistics, point estimation, sufficiency and completeness, confidence regions, classical theory of hypothesis testing, linear regression, nonclassical procedures.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 564. Probability Models **3 Units**
Prerequisite(s): MATH 561.
Description: Finite probability models, Markov chains, renewal and reliability theory, Brownian motion, stochastic differential equations.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 568. Mathematical Models in Molecular Biology **3 Units**
Prerequisite(s): MATH 205 or instructor consent.
Description: Introduction to probability models for representations of biochemical networks. Markov Processes. Stochastic simulation. Chemical and biochemical kinetics. Gillespie algorithm. Applications to intra-cellular kinetics.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 570. Foundations of Actuarial Science **3 Units**
Prerequisite(s): MATH 561.
Description: Fundamental mathematical tools for quantitatively assessing risk. Application of these tools to problems encountered in actuarial science is emphasized. Covers the material of Examination 1 of the Society of Actuaries and Casualty Actuarial Society.
Note: Credit may not be applied toward a graduate degree in mathematics.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 573. Actuarial Models I **3 Units**
Term Typically Offered: Occasionally Offered
Prerequisite(s): MATH 570; MATH 372 or MATH 572.
Description: This course covers the material for the Society of Actuaries Exam MFE, Actuarial Models-Financial Economics (also CAS Exam 3F). The syllabus for Exam MFE develops the student's knowledge of the theoretical basis of financial models and the application of those models to insurance and other financial risks. A thorough knowledge of calculus, probability and interest theory is assumed.In addition, for Exam MFE/3F, students are assumed to be familiar with derivative securities (introductory material).
Note: Knowledge of risk management at the level of MATH 570 is assumed.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 574. Actuarial Models II **3 Units**
Prerequisite(s): MATH 573.
Description: It further develops knowledge of the theoretical basis of actuarial models and the application of those models to insurance and other financial risks.
Note: Continuation of MATH 573.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 581. Introduction to Graph Theory **3 Units**
Term Typically Offered: Fall Only
Prerequisite(s): MATH 206 or ENGR 102; MATH 311; MATH 325 or consent of instructor.
Description: Provides an overview of graph theory. Topics include blocks, trees, connectivity, Hamiltonian and Eulerian graphs; topological problems, matrices and groups.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 587. Discrete Mathematics for MAT students **3 Units**
Prerequisite(s): MATH 206 or ENGR 102; MATH 325.
Description: Topics include: Pigeon-hole principle, counting techniques, binominal coefficients, generating functions, stirling and catalan numbers, permutations and graphs.
Note: Does not count towards the mathematics major or minor.
Note: Credit may be applied toward the MAT degree but not towards any other graduate degree in mathematics.
Note: Credit not allowed for both MATH 387 and MATH 587.

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 590. History of Mathematics - WR **3 Units**
Prerequisite(s): 500-level course in math (except MATH 560).
Description: Mathematical history from Mesopotamia to present. Emphasis on doing mathematics, identifying the growth of mathematical concepts and studying prominent mathematicians.
Note: Approved for the Arts and Sciences upper-level requirement in written communication (WR).

For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)

MATH 591. Selected Topics in Mathematics **1-3 Units**
Prerequisite(s): Announced in Schedule of Courses.
Description: An examination of one or more topics in mathematics not usually treated in a regularly offered course.
For class offerings for a specific term, refer to the Schedule of Classes (http://htmlaccess.louisville.edu/classSchedule/setupSearchClassSchedule.cfm)