LaGrange College Course Catalog - Mathematics

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LaGrange College

Course Catalog - Mathematics

MATH 0100 - Basic Mathematics

An introduction to algebra. Topics include instruction in real numbers, graphs, algebraic expressions, equations, and polynomials.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

MATH 1101 - College Algebra

A study of sets, real numbers, operations, order, inequalities, polynomial factoring, functions, graphs, exponents, first- and second-degree equations, and systems of equations.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

MATH 1114 - Introduction to Statistics

An introduction to probability and statistics. Topics include descriptive statistics, probability, normal probability, confidence intervals, hypothesis testing, and linear regression. Offered in Fall and Spring terms.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 1101 - College Algebra

MATH 1120 - Problem Solving

Individual and small-group problem solving geared toward real-life situations and nontraditional problems. The course focuses on a number of problem-solving strategies, such as drawing a diagram, eliminating possibilities, making a systematic list, looking for a pattern, guessing and checking, solving an easier related problem and sub-problems, using manipulatives, working backward, acting it out, unit analysis, using algebra and

finite differences, and others. Divergent thinking and technical communication skills of writing and oral presentation are emphasized.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 1101 - College Algebra

MATH 1221 - Precalculus

A study of calculus-oriented algebra and trigonometry. Topics include simplifying algebraic expressions, solving equations, exponential and logarithmic functions, applications of functions, graphs, and the trigonometric functions.

Grade Basis: ALP
Credit hours: 4.0
Lecture hours: 4.0

Prerequisites:

- MATH 1101 - College Algebra

Restrictions:

- Satisfactory Mathematics testing placement may also enable a student to take this course.

MATH 2221 - Analytic Geometry and Calculus I

An introduction to differentiation and integral calculus. Topics include limits, differentiation and applications, integration, and the calculus of exponential and logarithmic functions. Prerequisite: A grade of C- or better in MATH 2105 or 1121 (and permission of instructor) or satisfactory Mathematics placement recommendation.

Grade Basis: AL
Credit hours: 4.0
Lecture hours: 4.0

Prerequisites:

- MATH 1221 - Precalculus

Restrictions:

- A grade of C- or better in MATH 1221.

MATH 2222 - Analytic Geometry and Calculus II

A continuation of MATH 2221. Topics include the applications of integration, the calculus of inverse trigonometric functions, techniques of integration, indeterminate forms, improper integrals, sequence and series, and the parametric equations, and the polar coordinates. Prerequisite: A grade of C- or better in MATH 2221 or appropriate AP credit for MATH .

Grade Basis: AL
Credit hours: 4.0
Lecture hours: 4.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I

Restrictions:

- A grade of C- or better in MATH 2221.

MATH 2223 - Analytic Geometry and Calculus III

A continuation of MATH 2222. Topics include vectors and vector-valued functions of several variables, multiple integration, and vector analysis. Prerequisite: A grade of C- or better in MATH 2222 or appropriate AP credit for MATH 2221 and MATH 2222.

Grade Basis: AL
Credit hours: 4.0
Lecture hours: 4.0

Prerequisites:

- MATH 2222 - Analytic Geometry and Calculus II

Restrictions:

- C- or better in MATH 2222
- Appropriate AP credit for MATH 2221 and 2222.

MATH 2224 - Differential Equations

An introduction to differential equations. Topics include the study of first and second-order differential equations, first-order systems, linear systems, Laplace transforms, and numerical methods.

Grade Basis: AL
Credit hours: 4.0
Lecture hours: 4.0

Prerequisites:

- MATH 2223 - Analytic Geometry and Calculus III
- MATH 2241 - Programming for the Sciences

Restrictions:

- MATH 2223, 2241 can be either prerequisites or corequisites.
- Students can be added by permission of instructor.

MATH 2241 - Programming for the Sciences

A first course in mathematical programming in MATLAB that ranges from basic programming to the implementation of higher-level mathematics. Additional topics include learning a typesetting system (LaTeX) for producing technical and scientific documentation.

Grade Basis: AL
Credit hours: 4.0
Lecture hours: 4.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I

Restrictions:

- Offered in Fall semesters of odd years

MATH 3092 - Informatics/Data Mining

A study of the storage of data and the procedures used to extract and organize valuable information.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I
- MATH 2241 - Programming for the Sciences

MATH 3185 - Mathematical Modeling

A thorough introduction to mathematical modeling techniques. Topics include the quantification of physical processes, model predictions and natural systems, and model comparisons and results.

Grade Basis: ALP

Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I
- MATH 2241 - Programming for the Sciences

MATH 3225 - Introduction to Partial Differential Equations and Boundary Value Problems

Topics include Fourier Series, the Wave Equation, the Heat Equation, Laplace's Equation, Dirichlet Problems, Sturm-Liouville Theory, the Fourier Transform, and Finite Difference Numerical Methods. Offered on demand.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2224 - Differential Equations

MATH 3306 - College Geometry

A study of the concepts of plane Euclidean geometry, with an introduction to coordinate geometry and non-Euclidean geometries. Offered on demand.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I

MATH 3316 - Probability Theory

An Introduction to probability theory. Topics include random variables, method of enumeration, conditional probability, Baye’s theorem, discrete distributions (binomial distribution, and Poisson distribution), continuous distributions (uniform distribution, exponential distribution, gamma distribution, chi-square distribution, and normal distributions), Multivariate distributions. Offered in Spring semesters of even years.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2222 - Analytic Geometry and Calculus II

MATH 3317 - Mathematical Statistics

An introduction to the mathematical theory of statistics. Topics include estimation and maximum likelihood estimates, sampling distributions, confidence intervals, and hypothesis testing.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 3316 - Probability Theory

MATH 3335 - Linear Algebra

An introduction to linear algebra and matrix theory. Topics include vectors, systems of linear equations, matrices, eigenvalues, eigenvectors, and orthogonality. Offered in spring terms.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I
- MATH 2241 - Programming for the Sciences

Restrictions:

- Permission of instructor may grant access if the student does not meet one/both prerequisites.

MATH 3340 - History of Mathematics

An historical development of mathematical concepts.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I

Restrictions:

- Offered on demand

MATH 3380 - Discrete Mathematics

An introduction to discrete mathematics. Topics include set theory, combinatorics, recurrence relations, linear programming, and graph theory.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Restrictions:

- Offered in Fall semesters of even years

MATH 3382 - Combinatorial Design Theory

A study of techniques used for constructing combinatorial designs. Basic designs include triple systems, Latin squares, and affine and projective planes.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2221 - Analytic Geometry and Calculus I

Restrictions:

- Offered in Fall terms of odd years

MATH 4324 - Complex Variables

An introduction to complex variables. Topics include complex numbers, analytic functions, elementary functions, complex integration, series representations for analytic functions, residue theory, and conformal mapping. Offered in Spring terms of odd years.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2223 - Analytic Geometry and Calculus III

MATH 4333 - Modern Algebra I

An introduction to modern abstract algebra.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2222 - Analytic Geometry and Calculus II

Restrictions:

- Fall, odd years

MATH 4334 - Modern Algebra II

A continuation of Modern Algebra I.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 4333 - Modern Algebra I

Restrictions:

- Offered on demand.

MATH 4343 - Analysis I

An introduction to Analysis.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2223 - Analytic Geometry and Calculus III

Restrictions:

- Fall, even years

MATH 4344 - Analysis II

A continuation of Analysis I.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 4343 - Analysis I

Restrictions:

- On demand

MATH 4350 - Senior Capstone

A study of problem-solving techniques selected from the spectrum of Mathematics coursework required to complete a Mathematics major at LaGrange College. Topics come from a variety of areas, including algebra, trigonometry, geometry, calculus, discrete mathematics, probability and statistics, and mathematical reasoning and modeling. Offered in Spring terms.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Restrictions:

- Senior standing
- Permission of instructor

MATH 4410 - Numerical Methods I

An introduction to numerical analysis with computer solutions. Topics include Taylor series, finite difference, calculus, roots of equations, solutions of linear systems of equations, and least- squares. Offered on demand.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 2222 - Analytic Geometry and Calculus II

MATH 4411 - Numerical Methods II

A second course in numerical analysis with computational solutions. Topics include solutions to ordinary and partial differential equations, higher-order quadratures, curve-fitting, and parameter estimation.

Grade Basis: AL
Credit hours: 3.0
Lecture hours: 3.0

Prerequisites:

- MATH 4410 - Numerical Methods I

Restrictions:

- Offered on demand

MATH 4460 - Internship

Internship.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Restrictions:

- Requires faculty supervisor.

MATH 4495 - Independent Study in Mathematics I

This course allows students to pursue a special problem or topic beyond those encountered in any formal course. Course may be offered for variable credit.

Grade Basis: LP
Credit hours: 3.0
Lecture hours: 3.0

Restrictions:

- Prerequisites will be determined by the instructor, based on the material to be studied.
- On demand

MATH 4496 - Independent Study in Mathematics II

This course allows students to pursue a second special problem or topic beyond those encountered in any formal course. This course may be taken for variable credit.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Restrictions:

- Prerequisites will be determined by the instructor, based on the material to be studied.

MATH 4499 - Special Topics in Mathematics

Special topics in Mathematics.

Grade Basis: L
Credit hours: 3.0
Lecture hours: 3.0

Restrictions:

- Prerequisites will be determined by the instructor, based on the material to be studied.

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