

# MATHEMATICS (MAT)

## **MAT096 Preparation for Mathematics (3 course hours)**

For students who need a review of fundamental mathematics before entering college-level mathematics. Topics include fractions, decimals, ratios, and percentages; using expressions and solving equations; working with exponents; and graphing linear relationships. The course is not applicable to graduation core requirements or the major.

Course recommended for students in non-Math/Science majors.

## **MAT098 Algebra (3 course hours)**

A review of algebraic concepts and methods. Topics include the concepts of polynomials, factoring, solving equations and word problems, rational expressions, linear and quadratic functions, exponents and radicals. Not applicable to graduation core requirements or the major. Pre-requisites: ACT 17 OR SAT 400.

Recommended for students in the Maths and Sciences. Not applicable to graduation core requirements or the major. Standard calculator is TI-84.

**Course offered:** SEM

## **MAT105 General Education Mathematics (4 course hours)**

This course focuses on mathematical reasoning and the solving of real-life problems, rather than on routine skills. We will use technology (calculators and/or computers) to develop a conceptual understanding of problem-solving techniques that will strengthen decision making skills. The problems to be studied will be taken from the following areas: financial mathematics, probability, and statistics.

Pre-requisites: LDB105

## **MAT110 Mathematics Models: Graphical and Spatial (3 course hours)**

This course will focus on mathematical reasoning and modeling of real-life problems, rather than on routine skills. Students will use technology (graphing calculators/computers) to develop a conceptual understanding of problem-solving techniques that will strengthen decision-making skills. The problems to be studied will be taken from the following areas: graphs and functions in the coordinate plane, linear equations, geometric shapes and relationships, area/volume measure and scaling. Not applicable on SCM majors.

Pre-requisites: ACT 22 OR SAT 520 OR MAT096 OR M098 1 OR MAT098

**Course offered:** FAL

## **MAT111 Mathematical Models: Statistical and Numerical (3 course hours)**

This course will focus on mathematical reasoning and modeling of real-life problems, rather than on routine skills. Students will use technology (graphing calculators/computers) to develop a conceptual understanding of problem-solving techniques that will strengthen decision-making skills. The problems to be studied will be taken from the following areas: probability, statistics, and financial mathematics. Not applicable on SCM majors.

Not applicable to SCM majors. Standard calculator is TI-84.

Pre-requisites: ACT 22 OR SAT 520 OR MAT098 OR M098 1 OR MAT096

**Course offered:** SEM

## **MAT111H Mathematical Models: Statistical and Numerical - Honors (3 course hours)**

This course will focus on mathematical reasoning and modeling of real-life problems, rather than on routine skills. Students will use technology (graphing calculators/computers) to develop a conceptual understanding of problem-solving techniques that will strengthen decision-making skills. The problems to be studied will be taken from the following areas: probability, statistics, and financial mathematics. Not applicable on SCM majors.

Not applicable to SCM majors. Standard calculator is TI-84.

Pre-requisites: ACT 22 OR SAT 520 OR M098 1 OR MAT098 OR MAT096

**Course offered:** SEM

## **MAT112 Mathematics for Elementary Educ (3 course hours)**

Intended primarily for students majoring in elementary education, this course focuses on mathematical reasoning and problem solving. Topics include: whole numbers, integers, rational numbers, irrational numbers and the number system, arithmetic operations and number theory. Not applicable on SCM majors.

WARNING: This course is intended for Early Childhood and Elementary Education majors and does not satisfy the general education mathematics requirement for other majors.

Not applicable on SCM majors

Pre-requisites: ACT 22 OR SAT 520 OR MAT098 OR M098 1 OR MAT096

**Course offered:** SPR

## **MAT211 Functions and Calculus I (5 course hours)**

A study of calculus techniques and applications. An investigation of limits, continuity and derivatives of polynomial, rational and trigonometric functions. (A review of pre-calculus topics and trigonometric identities is included when appropriate.) Derivative techniques include power, chain, product and quotient rules as well as derivatives of trigonometric functions. Applications include optimization, implicit differentiation and related rates. Introduces the definite integral and the Fundamental Theorem of Calculus.

Standard calculator is TI-84.

Pre-requisites: ACT 22 OR SAT 520 OR MAT098 OR M098 1

**Course offered:** FAL

## **MAT211H Functions and Calculus I Honors (5 course hours)**

A study of calculus techniques and applications. An investigation of limits, continuity and derivatives of polynomial, rational and trigonometric functions. (A review of pre-calculus topics and trigonometric identities is included when appropriate.) Derivative techniques include power, chain, product and quotient rules as well as derivatives of trigonometric functions. Applications include optimization, implicit differentiation and related rates. Introduces the definite integral and the Fundamental Theorem of Calculus.

Standard calculator is TI-84.

Pre-requisites: ACT 22 OR SAT 520 OR M098 1 OR MAT098

**Course offered:** FAL

## **MAT215 Calculus w/Analytic Geometry I (3 course hours)**

Includes limits, continuity, differentiation of simple algebraic and transcendental functions, implicit differentiation, related rates, maxima and minima problems.

Standard calculator is TI-84.

Pre-requisites: ACT 29 OR SAT 650 OR MAT098 OR M098 1

**Course offered:** FAL

**MAT215H Calculus w/Analytic Geometry I Honors (3 course hours)**

Includes limits, continuity, differentiation of simple algebraic and transcendental functions, implicit differentiation, related rates, maxima and minima problems.

Standard calculator is TI-84.

Pre-requisites: ACT 29 OR SAT 650 OR M098 1 OR MAT098

**Course offered:** FAL

**MAT216 Calculus w/Analytic Geometry II (4 course hours)**

Covers antiderivatives, definite integrals, the calculation of areas and volumes, lengths of curves, logarithmic and exponential functions, infinite sequences and series.

Standard calculator is TI-84

Pre-requisites: MAT215 OR MAT211

**Course offered:** SPR

**MAT301 Mathematics Junior Seminar (1 course hour)**

This class builds on GEN101 and prepares mathematics students for GEN401. Drawing on their entire Judson experience and their particular major courses students will reflect and articulate how that experience is shaping them as whole persons. Through guided discussion and assignments, students will explore the particular way mathematics training has shaped them and will envision and articulate how the Judson experience will affect how they shape their world.

**Fulfills:** GEN301 Equivalent

Must be at Junior/Senior status before the class begins.

**Course offered:** SPR

**MAT309 Advanced Mathematical Principles (3 course hours)**

A survey of basic mathematical topics including: numeration systems, rational numbers, real numbers, complex numbers; functions; algebra and equation solving; trigonometry; area, volume, and capacity. Basic ideas will be studied and explored from an advanced perspective.

Open to math secondary education and math majors and minors only.

Pre-requisites: MAT211 OR MAT215

**Course offered:** ESPR

**MAT311 Probability and Statistics w/Lab (4 course hours)**

Covers descriptive statistics, counting techniques, basic rules of probability, discrete and continuous random variables, confidence intervals, hypothesis testing regression and correlation. Graphing calculators and computer software will be relied upon heavily. Lecture and Lab.

Science/Math Fee: \$175.00

Instructor may override prereq. Standard calculator is TI-84.

Pre-requisites: MAT211 OR MAT110 OR MAT111 OR MAT215

**Course offered:** SEM

**MAT312 Modern Abstract Algebra (3 course hours)**

Study of algebraic properties of groups, rings, fields, and integral domains. Covers introduction to the integers, real and complex numbers, rings of polynomials over real numbers, quotient rings, isomorphisms, and homomorphisms.

Pre-requisites: MAT211 OR MAT215

**Course offered:** OSPR

**MAT313 Modern Geometry (3 course hours)**

An examination of plane Euclidean geometry. Additional topics covered in finite, affine and projective Euclidean, and selected non-Euclidean geometry from both the axiomatic and transformational approaches.

Instructor may override prereqs.

Pre-requisites: MAT215 OR MAT211

**Course offered:** ESPR

**MAT314 Discrete Mathematics (3 course hours)**

Introduction to sets, relations and functions, combinatorics, mathematical proofs (by induction and indirect proofs); theory and application of graphs, trees, networks and circuits. Emphasis on problem solving.

Pre-requisites: MAT215 OR MAT211

**Course offered:** OFAL

**MAT314H Discrete Mathematics - Honors (3 course hours)**

Introduction to sets, relations and functions, combinatorics, mathematical proofs (by induction and indirect proofs); theory and application of graphs, trees, networks and circuits. Emphasis on problem solving.

**Course offered:** OFAL

**MAT316 Multivariable Calculus (4 course hours)**

A study of multivariable calculus including vector functions, partial differentiation, multiple integrals and vector calculus.

Standard calculator is TI-84

Pre-requisites: MAT216

**Course offered:** OSPR

**MAT316H Multivariable Calculus - Honors (4 course hours)**

A study of multivariable calculus including vector functions, partial differentiation, multiple integrals and vector calculus.

Standard calculator is TI-84.

Pre-requisites: MAT216

**Course offered:** SPR

**MAT318 Linear Algebra (3 course hours)**

A study of systems of equations, matrices, determinants, vectors, vector spaces, linear transformations, eigenvalues, and eigenvectors.

Pre-requisites: MAT215 OR MAT211

**Course offered:** EFAL

**MAT318H Linear Algebra - Honors (3 course hours)**

A study of systems of equations, matrices, determinants, vectors, vector spaces, linear transformations, eigenvalues, and eigenvectors. Fulfills Honors Program hour requirement.

Pre-requisites: MAT211 OR MAT215

**Course offered:** EFAL

**MAT419 Senior Seminar in Mathematics (3 course hours)**

Intended for secondary mathematics education majors, this course examines the mathematical content of grades K-12 from the perspective of higher education. Student participation in class discussions as well as student presentations based on an independent examination of current literature is expected and will play a critical role in this class.

This course is required by all secondary education/math majors - others require instructor permission. Additional fee may be applicable

**Course offered:** ESPR

**MAT492 Senior Readings in Mathematics (1-3 course hours)**

A required readings course for mathematics majors during their senior year. The readings will be taken from a faculty-approved list and written reports over all readings will be required. Each student will also compile and submit an essay reflecting how work done during their undergraduate courses in mathematics can be considered a God-ordained exploration.

**Course offered:** SEM