Academic Offerings

This section contains descriptions of programs, majors, minors, areas of concentration, fields of specialization, and courses. Semesters following course titles indicate when each course is normally offered. On rare occasions, a course may not be available when indicated because of low enrollment or unexpected staffing changes.

Courses listed as Fall Odd and Spring Even are scheduled to be offered during the 2015-16 academic year. i.e., fall 2015-16 is Fall Odd, spring 2015-16 is Spring Even.

Mathematics

General Major–Mathematics 152, 153, 201, 203, 212, 291, 304, 311, 315, 390, 392; one mathematics course numbered above 201; one course from Mathematics 341-348, Computer Science 110 or 111.

Mathematics/Computer Science Major–Mathematics 152, 153, 201, 204, Mathematics 215 and 216; Computer Science 111, 112, 120, 131, 145, 202, 305; one course from Computer Science 220, 231, 308, 311; Mathematics 390 or Computer Science 390.

General Minors–

Applied Mathematics: Mathematics 152, 153, 291; three courses from Mathematics 201, 203, 204, 209, 315; Statistics 131 or 132.

Mathematics: Mathematics 152, 153, 203, 212, 291; one course from Mathematics 304, 311, 315; one mathematics course numbered above 200.

For descriptions of EDUCATION majors, minors, fields of specialization, and teaching endorsements, see pages 78-93, Teacher Preparation Program.

100 Mathematics for College (3) .......................................................................................................................................................................................... Fall, Spring
This course prepares students for college-level mathematics through the study of algebra and geometry. The use of mathematical models will be woven throughout the course, providing students with the opportunity to see, understand, and use mathematics in a variety of applications. Also woven throughout is the understanding that mathematics is a creation of God, and must be used appropriately and responsibly. Corequisite: Mathematics 100L.

100L Mathematics Tutorial Sessions (1) .......................................................................................................................................................... Fall, Spring
A one-hour tutorial session twice per week required for students in Mathematics 100. Students do not earn graduation credit for the tutorial session. Corequisite: Mathematics 100.

108 Mathematics for the Elementary Teacher (3) .......................................................................................................................... Fall Even, Spring
This course provides students the content knowledge needed for teaching elementary and middle school mathematics. The topics will show that mathematics is part of God’s creation and how mathematics can be used to help understand and care for the creation. Specific topics include problem solving, numbers and numeration systems, computation and representation with integers, rational numbers and decimals, geometry and measurement. Prerequisite: elementary education major; an ACT mathematics score of 18 or higher or Mathematics 100.

118 Basis of Quantitative Thinking (3) .............................................................................................................................................. Fall Odd, Spring
This course is designed to provide students with knowledge in algebra, geometry, number theory, and probability and statistics for quantitative reasoning. The course will demonstrate that mathematics is part of God’s creation and will appreciate the intricate connection between various aspects of the creation including applications from other areas and interconnections between various topics in the course. Prerequisite: an ACT mathematics score of 18 or higher.

138 Fundamentals of Mathematics in Context (3) .......................................................................................................................................................... Spring Odd
This course studies the origins, historical development, and meaning of key concepts, techniques, and applications of elementary mathematics. Topics are drawn from arithmetic (numeration systems, calculation procedures, number types), geometry (measurement, geometric constructions, shapes, deductive reasoning), and algebra (proportionality, problem-solving, theory of equations, graphing). Students will gain a more profound and thorough understanding of important foundational ideas in mathematics while exploring the broader historical, social, and philosophical contexts of the field. Prerequisite: an ACT mathematics score of 22 or higher or satisfactory completion of Mathematics 100 or 118.

140 College Algebra (3) .......................................................................................................................................................................................... Fall, Spring Even
A study of standard pre-calculus topics in algebra and trigonometry. Elementary functions and functional notation are emphasized in
preparation for calculus. Prerequisite: an ACT mathematics score of 22 or higher or satisfactory completion of Mathematics 100 or 118.

145 Mathematical Modeling and Simulation (3).............................................................................................................................................Fall (First offered Fall 2016)
A variety of topics from the sciences will be used to introduce students to the fundamental concepts of mathematical modeling and to several simulation tools. Topics may include: constrained and unconstrained growth, terminal velocity of falling objects, drug dosages, the spread of disease, population dynamics, enzyme kinetics, green house effects, pollution effects, the spread of forest fires, foraging, diffusion, etc. Modeling methods and tools for continuous and agent based models will be used. Prerequisite: Mathematics 140 or equivalent high school mathematics.

148 Introduction to Financial Mathematics (2).....................................................................................................................................Fall
This course covers topics in basic interest theory including interest, annuities, and amortization as well as basic concepts in derivatives markets including stocks, bonds, forwards, puts, calls, spreads, and hedges. Course content is taught using a guided discovery approach focusing on student conceptual understanding. The course also includes discussion of Christian perspectives on investments and risk management. Offered first half of fall semester. Prerequisite: an ACT mathematics score of 22 or higher or satisfactory completion of Mathematics 100 or 118; strong algebra skills. [Cross-listed: Statistics 148]

151 Calculus for Business, Social, and Life Sciences (4)..............................................................................................................................Occasional
A study of the basic concepts and techniques of calculus for students majoring in business, social sciences, or life sciences. Topics include limits, differentiation, integration, exponential and logarithmic functions, partial derivatives, multiple integrals, and applications. Credit will not be given for both Mathematics 151 and 152. Prerequisite: grade of C- or higher in Mathematics 140 or equivalent.

152 Calculus I (4).........................................................................................................................................................................................Fall, Spring
A study of the basic concepts and techniques of calculus for students majoring in mathematics, computer science, engineering, or the physical sciences. Topics include limits, differentiation, integration, and applications. This course is intended for students without any previous calculus credit. Credit will not be given for both Mathematics 151 and 152. Prerequisite: grade of C- or higher in Mathematics 140 or equivalent.

153 Calculus II (4).......................................................................................................................................................................................Fall, Spring
Continuation of Mathematics 152; a study of transcendental functions, integration techniques, Taylor series approximations, calculus in polar coordinates, vectors, calculus of vector valued functions and applications of calculus. Students with one semester of calculus credit should take this course instead of Mathematics 152. Prerequisite: grade of C- or higher in Mathematics 152 or equivalent.

201 Multivariable Calculus (3)..................................................................................................................................................................Spring
A study of differential and integral calculus of functions of several variables, and line and surface integrals. Prerequisite: grade of C- or higher in Mathematics 153.

203 Elementary Linear Algebra (3).......................................................................................................................................................Fall
An introductory study of vectors, matrices, linear transformations, vector spaces, determinants, and their applications, with particular emphasis upon solving systems of linear equations. Pre- or corequisite: Mathematics 153; or permission of instructor.

204 Differential Equations (3).................................................................................................................................................................Fall
An introduction to the theory and techniques of solving elementary differential equations and the use of these techniques in applied problems. Prerequisite: grade of C- or higher in Mathematics 153.

207 Number Theory (3)..............................................................................................................................................................................Spring Even
An introduction to the main topics of elementary number theory, including divisibility, prime numbers, factorization congruences, number theoretic functions, and number theoretic equations. Prerequisite: grade of C- or higher in Mathematics 151 or 152; or permission of instructor.

208 Modern Geometry (3).................................................................................................................................................................Fall Even
A study of the basic concepts of modern geometry, both Euclidean and non-Euclidean, with some attention given to finite and projective geometry. Prerequisite: grade of C- or higher in Mathematics 151 or 152; or permission of instructor.

209 Numerical Analysis (3).................................................................................................................................................................Spring Odd
A study of numerical methods for integration, differentiation, calculus of finite differences, and applications, using the computer. Prerequisites: grade of C- or higher in Mathematics 153; Computer Science 111.

212 Discrete Structures (3).................................................................................................................................................................Spring
A study of topics in discrete mathematics that are relevant to computer science and mathematics, including logic and proof, induction and recursion, elementary set theory, combinatorics, relations and functions, Boolean algebra, and introductory graph theory. Prerequisite: grade of C- or higher in Mathematics 151 or 152; or permission of instructor.

215 Introduction to Univariate Probability (2).......................................................................................................................................Spring Odd
An introduction to the theory and techniques of general probability and common univariate probability distributions. Topics include but
are not limited to basic set theory, introductory probability rules (independence, combinatorials, conditionals, Bayes theorem, etc.), common univariate distributions (e.g., binomial and normal) and expected value/variance. Offered first half of the semester. Pre-or corequisite: Mathematics 152. [Cross-listed: Statistics 215]

216 Introduction to Multivariate Probability (2) Spring Odd
An introduction to multivariate probability distributions. Topics include but are not limited to joint probability density functions, conditional and marginal probability distributions, moment generating functions, covariance and correlations, transformations and linear combinations of independent random variables. Offered second half of the semester. Prerequisite: Mathematics 215. Pre- or corequisite: Mathematics 152. [Cross-listed: Statistics 216]

218 Intermediate Financial Mathematics (2) Fall
This course covers intermediate topics in financial mathematics including progressing annuities, force of interest, duration, convexity, immunization, swaps, forwards and other topics on Actuarial Exam FM/2 that are not covered in Mathematics 148. Offered second half of fall semester. Prerequisite: Mathematics 148. Pre- or corequisite: Mathematics 151 or 152. [Cross-listed: Statistics 218]

281 Service-Learning (1-3) Fall, Spring, Summer
See page 113, Individual Studies

291 Problem-solving Seminar (1) Fall Odd
Problem-solving is at the heart of doing mathematics. This seminar provides unity to the concepts and approaches learned throughout the mathematics major and minors as it examines various problem-solving techniques. Weekly sessions will be devoted primarily to presenting problem-solving techniques and solving a variety of problems. Open to sophomores, juniors, and seniors. Graded on a pass/no-record basis. Prerequisite: grade of C- or higher in Mathematics 152; or permission of instructor.

304 Abstract Algebra I (3) Fall Even
An introduction to algebraic structures focused mainly on groups. Brief attention is given to rings, integral domains, and fields. Prerequisite: grade of C- or higher in Mathematics 203 and 212; or permission of instructor.

305 Abstract Algebra II (3) Spring Odd
Continuation of Mathematics 304. A more extensive study of algebraic structures, focused primarily on fields. This course is offered as an individual studies course unless there is sufficient enrollment to warrant otherwise. Prerequisite: grade of C- or higher in Mathematics 304.

311 Real Analysis I (3) Fall Odd
An introduction to the content and methods of single-variable real analysis: infinite sets, the real number system, sequences, limits, series, continuity, differentiation, and integration. Prerequisite: grade of C- or higher in Mathematics 212; or permission of instructor.

315 Complex Analysis (3) Spring Even
A study of the complex number system, functions of complex numbers, integration, differentiation, power series, residues and poles, and conformal mappings. Prerequisite: grade of C- or higher in Mathematics 201; or permission of instructor.

341 Special Topics (3) Spring Even
These mathematics courses cover different topics that maximize individual instructor strengths, interests, and competencies. Each course will deal with a topic in mathematics not usually covered extensively in regularly scheduled courses.

390 History of Mathematics (3) Fall Odd
A survey of the history of mathematics from ancient times into the 20th century, in cultural context, with attention given to how the philosophy of mathematics relates to the development of mathematics. Prerequisite: grade of C- or higher in Mathematics 151 or 152; or permission of instructor.

391 Individual Studies (1-3) Fall, Spring, Summer
See page 113, Individual Studies. Permission of instructor required.