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 2011-2012 academic year. i.e., fall 2011-2012 is Fall Odd, spring 2011-2012 is Spring Even.

Mathematics

General Major– Mathematics 152, 153, 201, 203, 212, 304, 311, 315, 390, 392; one mathematics course numbered above 201; two courses from Mathematics 291-294; one course from Mathematics 341-8; Computer Science 111.

Mathematics/Computer Science Major–Mathematics 152, 153, 203, 207, 209, 212, 304; one course from Mathematics 201, 204, 206; 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 Minor– Mathematics 152, 153, 203, 212, 390; one course from Mathematics 304, 311, 315; one mathematics course numbered above 200.

For descriptions of SECONDARY and ELEMENTARY majors, minors, fields of specialization, and teaching endorsements, see pages 111-134, Teacher Education Program.

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100 Mathematics for College (3) ..... Fall, Spring
This course prepares students for college-level mathematics through the study of algebra, probability, statistics, 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 two-hour tutorial session per week required for students in Mathematics 100. Students do not earn graduation credit for the tutorial session. Corequisite: Mathematics 100.

106 Mathematical Applications (3) ..... Fall, Spring
The goal of this course is to demonstrate selected contemporary applications of mathematics in God's world. Students will study ideas from graph theory, linear programming, voting theory, probability and statistics, and their use.

108 Mathematics for the Elementary Teacher (3) ..... Fall
Mathematics 108 and Education 332 form an integrated sequence in the content and methods of teaching mathematics in the elementary and middle school. Mathematics content topics include problem solving, numbers and numeration systems, computation and representation with integers, rational numbers and decimals, probability, geometry and measurement. Methods topics include the materials, methods, goals and evaluation of the teaching of mathematics. Mathematics 108 focuses more on mathematics content, while Education 332 places more emphasis on the methods of teaching mathematics. This course is not open to freshmen. Prerequisite: elementary education major; others by permission of instructor.

118 **Basis of Quantitative Thinking (3)** ..... 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.

131 **Elementary Statistics (3)** ..... Fall, Spring
An elementary course in statistical techniques and methods and their application to a variety of fields. Topics include data analysis, design of experiments, and statistical inference including confidence intervals and hypothesis testing. Spreadsheet knowledge is suggested.

138 **Fundamentals of Mathematics in Context (3)** ..... Spring
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 Math 100, 106 or 118.

140 **College Algebra (3)** ..... Fall, Spring
A study of standard pre-calculus topics in algebra and trigonometry. Elementary functions and functional notation are emphasized in preparation for calculus. Prerequisite: three semesters of high school algebra.

151 **Calculus for Business, Social, and Life Sciences (4)** ..... Spring
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: Mathematics 140 or equivalent.

152 **Calculus I (4)** ..... Fall
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: Mathematics 140 or equivalent.

153 **Calculus II (4)** ..... Fall, Spring
Continuation of Mathematics 152; a study of transcendental functions, integration techniques, sequences, series, polar graphing, parametric equations, and applications. Students with one semester of calculus credit should take this course instead of Mathematics 152. Prerequisite: Mathematics 152 or equivalent.

201 **Multivariable Calculus (3)** ..... Spring
A study of the algebra and calculus of vector-valued functions, three-dimensional analytic geometry, differential and integral calculus of functions of several variables, and line and surface integrals. Prerequisite: 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 by 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: Mathematics 153.

206 **Probability and Statistics (3)** ..... Spring Odd
An introduction to the theory and techniques of statistical analysis; probability, random variables, discrete and continuous distributions, estimation, and statistical hypothesis testing. Prerequisite: Mathematics 153 or by permission of instructor.

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: Mathematics 151 or 152 or by 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: Mathematics 151 or 152 or by permission of instructor.

209 **Numerical Analysis (3)** ..... Spring Even
A study of numerical methods for integration, differentiation, calculus of finite differences, and applications, using the computer. Prerequisites: 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: Mathematics 151 or 152 or by permission of instructor.

281-283 **Service-Learning (1-3)** ..... Fall, Spring, Summer
See page 161, Individual Studies

291-294 **Problem-solving Seminar (1)** ..... Fall
A study of various mathematical problem-solving techniques. Weekly sessions will be devoted primarily to presenting and solving Putnam Examination problems. Open to qualified freshmen and sophomores with permission of instructor. Graded on a pass/no-record basis. Prerequisite: Mathematics 152 or by 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: Mathematics 203 or 212 or by permission of instructor.

305 **Abstract Algebra II (3)** ..... Occasional
Continuation of Mathematics 304. A more extensive study of algebraic structures, focused primarily on fields. Prerequisite: 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: Mathematics 212 or by 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: Mathematics 201 or by permission of instructor.

341-348 **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: Mathematics 151 or 152 or by permission of instructor.

391-393 **Individual Studies (1-3)** .....Fall, Spring, Summer
See page 161, Individual Studies