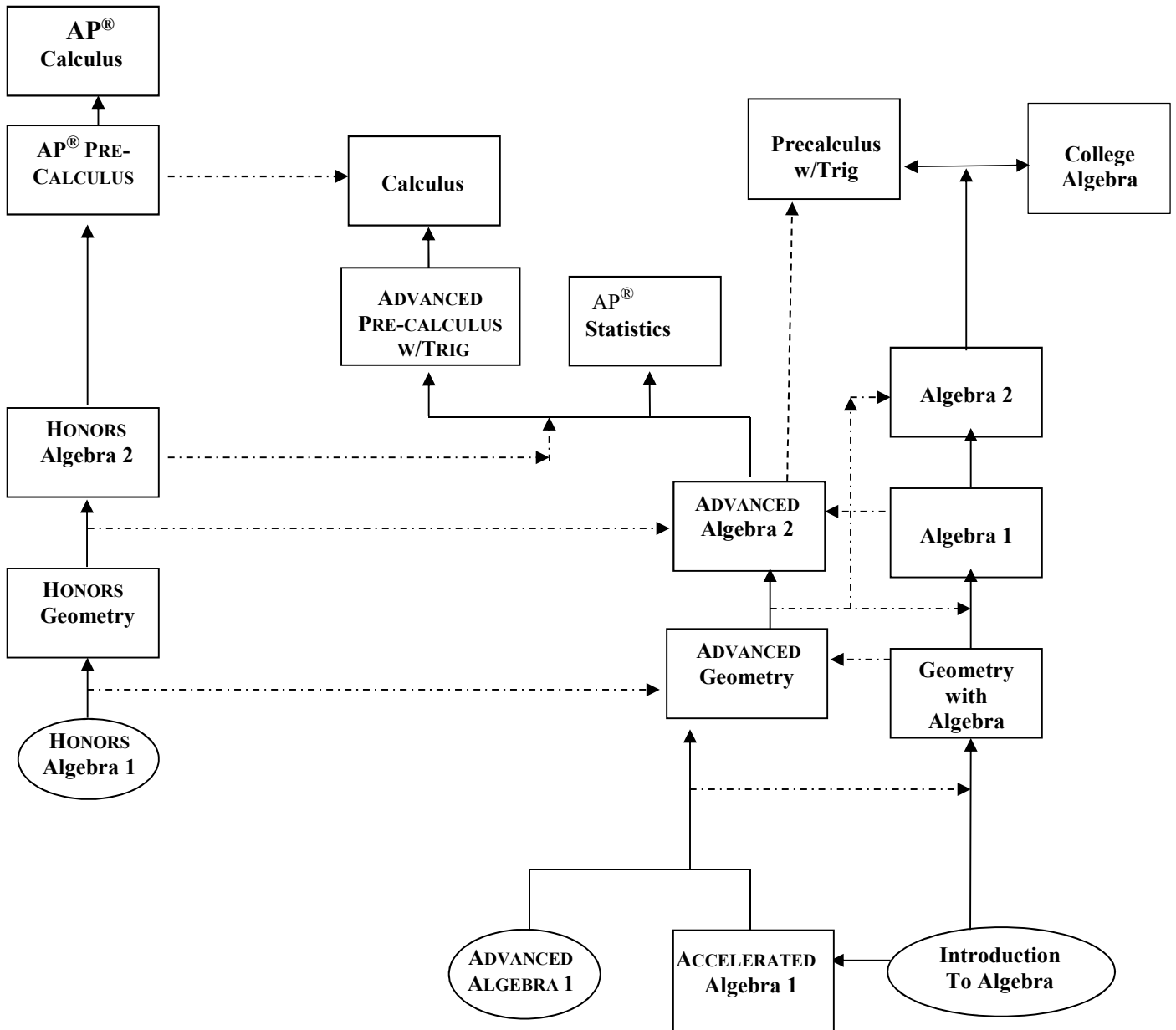


MATHEMATICS DEPARTMENT COURSE SEQUENCE FLOWCHART

All courses meet for the entire school year. To continue with courses in the college-prep sequence, students must pass the prerequisite course with a grade of “C” or better.

To take courses in the Honors sequence, a student must receive the consent of the department or have passed the prerequisite course with a grade of “B” or better. ***If recommended by their Honors Algebra 1 teacher, students may enroll in Honors Geometry and Honors Algebra 2 concurrently. Students will be permitted to enroll concurrently in two mathematics courses in the same semester ONLY in special circumstances to be determined by the School Counselor, communicated to the Mathematics Department Chairperson, AND with department chairperson approval. Enrollment in Accelerated Algebra 1 is limited to sophomores by invitation only.***



INTRODUCTION TO ALGEBRA

Full Year 1/2 credit per semester

Open to all levels

Prerequisite: None

Prerequisite: None

Introduction to Algebra introduces the skills and concepts of a first-year algebra course. Emphasis will be upon the skills needed to solve and graph linear equations and inequalities, solve systems of equations, and complete applications of linear equations and systems of linear equations, along with all the numerical concepts required to support these topics. The course is specifically designed to meet the needs of students requiring practice with algebra and number skills at a slower pace. Students completing both semesters of Introduction to Algebra will enroll in Geometry with Algebra.

ALGEBRA 1

NCAA*

Full Year 1/2 credit per semester

Open to juniors and seniors

Prerequisite: Pass BOTH semesters of Introduction to Algebra and Geometry with Algebra

Algebra 1 is a one-year course of study of first year Algebra Topics that will build upon the student's previous knowledge of mathematics obtained in Introduction to Algebra and Geometry with Algebra. Algebra 1 will serve as a second course after Geometry with Algebra that will prepare students for course work in Algebra 2. Topics in Algebra 1 will include study of the real number line and its properties, solving linear and quadratic equations, as well as a review of how to solve systems of linear equations. Students will do work with Laws of Exponents, perform basic operations on polynomials, factor polynomials, simplify rational expressions and solve rational equations. Graphing quadratic functions, and work with probability will be undertaken. Students will also prepare for the SAT and ACT tests. Juniors who successfully complete Algebra 1 may enroll in Algebra 2.

GEOMETRY WITH ALGEBRA

NCAA

Full Year 1/2 credit per semester

Open to sophomores, juniors and seniors

Prerequisite: Completion of BOTH Semesters of Introduction to Algebra OR an equivalent introductory level Algebra course.

Geometric concepts needed for success in more advanced algebra courses will be studied. Topics, skills, and concepts previously covered in Introduction to Algebra which are relevant to work in Geometry will be reviewed and applied. Successful completion of both semesters of Geometry with Algebra will enable students to enroll in Algebra 1.

ALGEBRA 2

NCAA

Full Year 1/2 credit per semester

Open to juniors and seniors

Prerequisite: Successful completion of Geometry with Algebra and Algebra 1 OR successful completion of Advanced Algebra 1 and Advanced Geometry with recommendation by a student's most recent mathematics teacher.

Algebra 2 will serve as the final course in the Introduction to Algebra, Geometry with Algebra, Algebra 1 sequence or a third course in the Advanced Algebra 1, Advanced Geometry sequence. Students taking this course should be preparing for further study at the post secondary level. Students are strongly encouraged to have a Texas Instruments Graphing Calculator to use throughout the course. Students will examine the real number system in conjunction with set theory. Students will take knowledge from Algebra 1 and expand upon it in areas such as linear equations and inequalities, functions, and linear and quadratic functions. Students will study quadratic functions and factoring, polynomials and polynomial functions, rational exponents, and radical functions. Students will also explore new areas such as polynomial functions, exponential and logarithmic functions, trigonometric functions, and statistics. Juniors who successfully complete Algebra 2 may enroll in College Algebra with Trigonometry as seniors. Students successfully completing both semesters of Algebra 2 are **not** eligible to enroll in either Advanced Precalculus with Trigonometry or Statistics.

COLLEGE ALGEBRA

Full Year

NCAA

1/2 credit per semester

Open to seniors and qualifying juniors.

Prerequisite: Completion of both semesters of Algebra 2 with a B- or below OR successful completion of both semesters of Advanced Algebra 2 with a grade of D+ or below.

COLLEGE ALGEBRA is a full year course reviewing and extending upon Algebra 2 topics. The study of functions and their graphs will be emphasized. Topics will include linear, quadratic, piece-wise, rational, polynomial, exponential and logarithmic functions. Matrix algebra and basic arithmetic of complex numbers will be new topics covered in this course. Upon successful completion of this course, students will be able to apply a variety of problem-solving strategies to find solutions to an array of real-life problems. This course will provide the algebraic skills needed to pursue higher level studies in mathematics. All students registering for this course are required to have a graphing calculator.

PRECALCULUS WITH TRIGONOMETRY

Full Year

NCAA

1/2 credit per semester

Open to seniors and qualifying juniors

Prerequisite: Successful completion of both semesters of Algebra 2 with a B or better OR successful completion of both semesters of Advanced Algebra 2 with a passing grade of C+ or lower. The TI-84 Graphing Calculator will be used for classroom work.

PRECALCULUS with Trigonometry is a full-year course reviewing and extending upon Algebra 2 topics. Linear, quadratic, polynomial, logarithmic, exponential, and rational functions will be studied. Application of each of these functions to real world problems will be explored. During the second semester, trigonometric functions and their applications will be introduced. Units dealing with conic sections and statistics will be covered second semester. This course will help lay a foundation for students preparing for further study at the post-secondary level. Students who have completed Honors Algebra 2 are not eligible to enroll in this course. All students registering for this course are required to have a graphing calculator.

ADVANCED MATH SEQUENCE

ADVANCED ALGEBRA 1

Full Year

NCAA

1/2 credit per semester

Open to freshman

Prerequisite: None

Advanced Algebra 1 is an intensive one-year course that will build upon the student's previous knowledge of mathematics by emphasizing language relating to the real number system and its properties. Topics include: expressions, equations and applications, inequalities, linear functions, linear equations and their graphs, systems of linear equations, exponents and exponential functions, polynomial operations and factoring, radical expressions, and quadratic functions. This course will also introduce the student to the TI-84 graphing calculator. It is strongly recommended that students purchase their own calculator. Successful completion of Advanced Algebra 1 (with a grade of "C" or better both semesters) prepares students for enrollment in Advanced Geometry. Students who have passed Advanced Algebra 1 with a grade less than a "C" must enroll in Geometry with Algebra the following year.

ACCELERATED ALGEBRA 1

Full Year

NCAA

1/2 credit per semester

Open to sophomores by invitation only

Prerequisite: Recommendation by Introduction to Algebra teacher during the freshman year

Accelerated Algebra 1 is a one-year course that will expand upon student's previous knowledge of algebra, going into more depth and greater detail. First semester

topics will include linear equations and their graphs, inequalities, and linear functions, systems of equations and inequalities, and exponential functions. Second semester topics include polynomials and factoring, and radical expressions, quadratic functions, and rational expressions. This course will introduce students to the Texas Instruments graphing calculator. Students are strongly encouraged to purchase their own graphing calculator before the completion of the year. Successful completion of Accelerated Algebra 1 with a grade of C or better will enable students to enroll in Advanced Geometry.

ADVANCED GEOMETRY

Full Year

NCAA

1/2 credit per semester

Open to sophomores, juniors and seniors

Prerequisite: Completion of Advanced Algebra 1 or Accelerated Algebra 1 with a grade of C or better BOTH semesters.

Advanced Geometry is designed to help students develop habits of clear thinking in order to make conjectures and follow a logical sequence of deductive reasoning. Students will learn about geometric relationships in both two and three dimensions: lines, planes, angles, circles, polygons, etc. will be studied. Different problem-solving techniques are introduced and students are encouraged to use them when doing assignments. During the first semester students will focus on learning geometric concepts through constructions and transformations (most specifically of triangles). The development of logical proofs and the use of algebraic skills to solve geometric problems will also be emphasized. Focus the second semester will be on properties and formulas related to polygons, circles, coordinate geometry, polyhedra and work in three dimensions.

ADVANCED ALGEBRA 2

Full Year

NCAA

1/2 credit per semester

Open to sophomores, juniors and seniors

Prerequisite: Completion of Advanced Geometry with a grade of "C" (not C-) or higher both semesters AND a grade of "C" or higher both semesters of Advanced Algebra 1 OR a grade of A (95% or higher) both semesters in Algebra 1 and the recommendation of the Algebra 1 teacher.

Advanced Algebra 2 is a full-year course designed for college-bound students. Students are required to have a Texas Instruments Graphing Calculator which will be used extensively. The course begins with a review of the real numbers system and its properties, then continues on to solving and graphing linear functions. Linear systems eventually build into some basic work with matrices. The main emphasis in the systems chapter will be linear programming. First semester ends with the study of quadratic equations and functions. Students will graph quadratic functions and solve quadratic equations using several different methods. During the second half of the school year, students will study radical functions and rational expressions, exponential and logarithmic

(continued)

functions, rational functions, trigonometric functions, polynomials, and polynomial functions. Students enrolling in Advanced Algebra 2 should be motivated to work. They should also possess thinking skills that allow them to make the transition to a higher, more abstract cognitive level of mathematics than previously attained.

Students completing Advanced Algebra 2 with a passing grade of C- or less either semester will be recommended for College Algebra with Trigonometry placement. Students completing Advanced Algebra 2 with a grade of C or higher are eligible to enroll in Descriptive and Inferential Statistics. A grade of B or higher is necessary for enrollment in Advanced Pre-Calculus with Trigonometry.

AP DESCRIPTIVE AND INFERENCEAL STATISTICS

NCAA

Full Year 1/2 credit per semester
SLU Dual Credit Course

Prerequisite: Successful Completion of Advanced Algebra 2 with a grade of C or higher OR Honors Algebra 2 with a passing grade

Descriptive and Inferential Statistics is a year-long course designed to prepare students for collegiate level work in probability and statistics. Descriptive Statistics is studied first semester and includes such topics as graphical displays of data, numerical descriptions of data, summarizing bivariate data, probability, random variables, and probability distributions. Inferential statistics is the focus of second semester and includes such topics as planning a statistical study, point estimation, interval estimation, and various forms of hypothesis testing. Students who enroll in Statistics will be prepared to take the AP Statistics exam in early May. An increasing number of college programs and majors are requiring some coursework in statistics and this course serves as excellent preparation for such work. Applications and case studies are provided for study throughout the course and exposure to software programs used in collegiate statistics courses as well as the Statistics features of the TI-84 and TI Nspire calculator are essential components of the course. **The TI-84 and TI Nspire Graphing Calculator will be used for all work in this course.**

ADVANCED PRE-CALCULUS WITH TRIGONOMETRY

NCAA

Full Year 1/2 credit per semester
Open to juniors and seniors

Prerequisite Completion of Advanced Algebra 2 and Advanced Geometry with a grade of B- or higher both semesters in each course

Advanced Pre-Calculus with Trigonometry is a one-year course for students with a very strong background in both Algebra and Geometry who are interested in pursuing further coursework in mathematics, engineering, or the sciences. During first semester, students will study

polynomial, rational, exponential, and logarithmic functions and their properties. Second semester focuses on functions of arc lengths on the circumference of the unit circle (circular functions) and their graphs, trigonometric functions, trigonometric identities, inverse trigonometric functions, and algebraic solutions of trigonometric equations. A variety of application problems from surveying and navigation will be solved using the Law of Sines and Law of Cosines. Extensive use of graphing calculator technology will be made in this course, and each student will be required to have a TI-84 model graphing calculator in their possession every day. Successful completion of this course will prepare students for a first course in Calculus.

CALCULUS

NCAA

Full Year 1/2 credit per semester
Open to juniors and seniors
Prerequisite: Completion of Advanced Pre-Calculus with Trigonometry with a grade of "C"(not C-) or better both semesters

Calculus is a course designed to introduce students to the fundamental techniques and applications of calculus. Students review important pre-calculus topics with special emphasis on limits. Techniques of differentiation and integration are studied and applied to a variety of real-life situations. Although students are required to understand the meanings and applications of both the derivative and the integral, emphasis is placed upon skills and concepts rather than on a theoretical understanding of the calculus. This course is designed to prepare students for the AP Calculus AB exam, and it serves as an excellent preparation for college level calculus courses.

HONORS MATH SEQUENCE

HONORS ALGEBRA 1

NCAA

Full Year

1/2 credit per semester

*Open to freshmen**Prerequisite: Eligibility determined by qualifying criteria*

Honors Algebra 1 is a one-year course covering the material in a typical first-year algebra course plus additional topics, all at an accelerated pace and in greater depth. Solving equations, fractions and their applications, inequalities, polynomials, linear functions, systems of equations, rational expressions and equations, quadratic functions and data analysis are just some of the topics covered in this course. Some geometry topics are also integrated into the curriculum. The TI-84 graphing calculator is a valuable asset for this class. Each student is required to have one of these calculators in their possession for every class session. Successful completion of both semesters of this course with a grade of "B" (not B-) or higher is necessary for students to enroll in Honors Geometry as sophomores. A grade of "B-" or lower requires that the student take Advanced Geometry the following school year. The Honors Algebra 1 teacher may recommend that those students demonstrating exceptional talent and abilities in mathematics (very high A average both semesters) "double up" and enroll in both Honors Geometry and Honors Algebra 2 during the next school.

HONORS ALGEBRA 2

NCAA

Full Year

1/2 credit per semester

*Open to sophomores and juniors**Prerequisite: Completion of Honors Geometry with a grade of "B" (not B-) or higher both semesters OR recommendation by the Honors Algebra 1 teacher to double in Honors Geometry and Honors Algebra 2*

Honors Algebra 2 is a full-year course designed for the most talented students of mathematics at this level of the curriculum. A Texas Instruments Graphing Calculator is required and will be used extensively. Significant emphasis will be placed upon the language and vocabulary in mathematics. The course begins with a study of the algebraic properties, set theory, and a review of solving linear equations and inequalities. The first semester concentrates on linear functions and their applications. Students will discover how to work with linear functions numerically, graphically and algebraically. The concept of linear functions will be extended to and applied to systems of linear functions and matrix algebra. The first semester will conclude with a study of the laws of exponents. An in-depth study of polynomial, exponential, logarithmic, and rational functions will be the major focus of the second semester. Again, students will study these functions numerically, graphically, and algebraically. Students will explore multiple problem solving strategies, applying higher level thinking skills. In addition to the study of functions, inverse functions will be introduced and their application studied. A detailed analysis of the models and graphs of

conic sections will be implemented during the second semester. Finally, students will be introduced to the basic principles of probability as well as the statistical analysis of data. An abundance of real world applications will be presented throughout the year to enhance each student's appreciation and understanding of mathematics. Successful students that complete the course with a grade of "B" or better for both semesters may enroll in Honors PreCalculus/Trigonometry the following year.

HONORS GEOMETRY

NCAA

Full Year

1/2 credit per semester

*Open to freshmen and sophomores**Prerequisite: Completion of Honors Algebra 1 with a grade of "B" (not B-) or higher BOTH semesters*

Honors Geometry is a one-year course intended for mathematically-talented students. The mission of the class is to develop innovative problem solvers who think critically through problems, make connections, formulate creative strategies, apply mathematical concepts, generate accurate but efficient solutions, and effectively communicate ideas through logical reasoning. Emphasis first semester is placed upon language, developing logical reasoning skills by writing proofs as well as practicing creative problem-solving techniques. During second semester, students will study similarity, right triangles, circles, area, and volume of three-dimensional figures. Admission to the course as a Freshman is by invitation only.

Note: Consent of the department chairperson is required unless the Honors Algebra 1 prerequisite is satisfied.

AP[®] PRE-CALCULUS

NCAA

Full Year

1/2 credit per semester

*Open to juniors and seniors**Prerequisite: Completion of Honors Algebra 2 with a grade of "B" (not B-) or higher BOTH semesters*

AP Pre-Calculus is a one-year course for students who have demonstrated an aptitude for mathematics and have been very successful in previous Honors level mathematics classes. This mathematically rigorous course provides talented students with an environment rich in applications and problem solving. During first semester, students will study polynomial, rational, exponential, and logarithmic functions and their properties. Emphasis second semester is placed upon trigonometric functions and their graphs as well as trigonometric identities, trigonometric equations, vectors, and the solving of triangles. The year ends with a unit on vectors, parametric functions, and conic sections. Only students receiving a grade of B or higher in AP[®] Pre-Calculus are eligible to enroll in AP[®] Calculus the next school year.

AP[®] CALCULUS

Full Year



1/2 credit per semester

SLU Dual Credit Course

Prerequisite: Completion of Honors Pre-Calculus with Trig with a grade of "B" (not B-) or higher both semesters

AP[®] Calculus is an engineering-based one-year course designed to prepare the mathematically talented student for success in the fields of mathematics, engineering or the sciences at any major four-year college or university. Successful completion of AP[®] Calculus affords students the opportunity to receive dual credit through St. Louis University or to take the Advanced Placement (AP[®]) AB-Calculus Test. Concepts will be developed from a strong theoretical base. Understanding of concepts will be emphasized as well as practical applications from engineering and the sciences. Continuity and limits of functions will be studied and used to provide the theory base for the development of other concepts. First semester will focus upon concepts related to the differentiation of a function, including derivative rules, the chain rule, implicit differentiation, local linearization, and related rate and min/max problems. Transcendental functions will be introduced early in the course and used throughout. Integration theory and its applications will be the focus in the second semester. The Fundamental Theorem of Calculus will be explored, rules for integration and integration techniques will be studied. A variety of applications will be considered, including volumes of solids of revolution, surface areas of solids, as well as separable differential equations. Strategies will explore these concepts from numerical, graphical, and analytical perspectives. Each student will be required to have a TI-84 model graphing calculator for daily use.

