

MATHEMATICS and COMPUTER PROGRAMMING

All Worthington Kilbourne students are required to complete at least three units of credit in Mathematics and beginning with the Class of 2014, four units of credit in Mathematics. The Worthington School District believes that knowledge of mathematics is essential to the development of the whole person. Students are encouraged to realize their full potential in order to enhance their self-esteem and their ability to assume a purposeful role in our global society. The mathematics department highly recommends the purchase of a TI-84 calculator for use in all levels of mathematics classes from Algebra 2 through AP Calculus.

COURSES OFFERED

Grade	Course #	Course Title	Credits
9, 10,	3150	Algebra 1	1
10, 11	3210	Geometry	1
9, 10, 11	3230	Advanced Geometry	1
10, 11, 12	3160	Algebra 2	1
9, 10, 11, 12	3170	Advanced Algebra 2	1
9, 10	3180	Honors Algebra 2	1
10, 11	3171	Block Advanced Algebra 2	1
11, 12	3185	Financial Algebra	1
11, 12	3190	Algebra 3	1
10, 11, 12	3290	Functions, Statistics, and Trig. (FST)	1
10, 11	3295	Honors Functions, Statistics and Trig.	1
10, 11	3291	Block FST	1
11, 12	3330	Pre-Calculus and Discrete Math (PDM)	1
11, 12	3331	Honors Pre-Calc. and Discrete Math (Honors PDM)	1
11, 12	3370	Advanced Placement Calculus (AB)	1
11, 12	3380	Advanced Placement Calculus (BC)	1
9, 10, 11, 12	3980	Independent Studies in Mathematics	up to 2
*Computer Programming			
9, 10, 11, 12	1300	Intro to Computer Programming 1	1/2
9, 10, 11, 12	1305	Intro to Computer Programming 2	1/2
10, 11, 12	1315	Introduction to JAVA	1/2
11, 12	1320	Advanced Computer Science	1

* these courses do not satisfy the math graduation requirements

Sequence of Study

		Honors Algebra 2	Honors FST	Honors PDM	AP Calc BC
		Block Adv. Algebra 2	Block FST	PDM	Ap Calc AB
Algebra 1	Advanced-Geometry	Advanced Algebra 2	FST	PDM	AP Calc AB
Algebra 1	Geometry	Algebra 2	Algebra 3	FST	
			Financial Algebra for anyone completing Algebra 2		

Guidelines

- Freshmen will begin their sequence with Algebra 1, Advanced Geometry, or Honors Algebra 2 based upon their work in 8th grade.
- Most students who experience success in a course will move to the course listed to its' immediate right.
- Students who perform extremely well in a course may (with teacher recommendation) select the course listed diagonally to the right and up.
- Students who struggle in a course (but still pass the course) may choose the course listed diagonally to the right and down.

ALGEBRA 1

2 Semesters
1 Credit
Grades: 9, 10
Prerequisite: Teacher recommendation
Graded: Conventional

Algebra 1 is the foundation for all secondary mathematics. Students must have a solid understanding of this course to be fully prepared for other mathematics courses offered. Topics include the solving of equations and inequalities (including quadratics), coordinate geometry, probability, functions, and statistics applications are used to develop concepts; models of the four arithmetic operations are extended

to expressions involving variables; and rates of change and the graphing of lines are emphasized. Systems, polynomials, and square roots are related to geometry and include real-world applications.

GEOMETRY

2 Semesters
1 Credit
Grades: 10, 11
Prerequisite: Alg. 1 and teacher recommendation
Graded: Conventional

This course concentrates on the basic elements of geometry. A significant portion of this course is devoted to developing plane geometry with the inclusion of some proofs. Topics include properties of specific figures, congruence and similarity of figures, surface area and volume, transformations, and right triangle trigonometry. This course introduces coordinate proof and analytic geometry. Algebra skills are utilized to solve many geometric problems. The Math Department discourages selection of this class by ninth grade students.

ADVANCED GEOMETRY

2 Semesters
1 Credit
Grades: 9, 10, 11
Prerequisite: Algebra 1, and teacher recommendation
Graded: Conventional

A significant portion of this course is devoted to developing plane geometry with the inclusion of proofs. Topics include properties of specific figures, congruence and similarity of figures, surface area and volume, transformations, and right triangle trigonometry. The remainder of the course introduces coordinate proof and analytic geometry. Real world applications are introduced throughout the course as applicable. Algebra skills are required to solve many geometric problems.

ALGEBRA 2

2 Semesters
1 Credit
Grades: 10, 11, 12
Prerequisite: Advanced Geometry or Geometry, teacher recommendation
Graded: Conventional

Algebra 2 emphasizes a review of Algebra 1 and Geometry topics, and introduces Algebra 2 topics including relations and functions, linear and quadratic equations, inequalities, systems of equations, and the properties and structure of the number system. New topics include matrices; functions and their inverses; trigonometric, exponential, and logarithmic functions; the complex number system, and polynomial functions and equations.

ADVANCED ALGEBRA 2

2 Semesters
1 Credit
Grades: 9, 10, 11, 12
Prerequisite: Advanced Geometry or Geometry and teacher recommendation
Graded: Conventional

The Algebra 2 course reviews and extends the algebraic concepts introduced in Algebra 1 and Geometry, including further study of relations and functions, linear and quadratic equations, inequalities, systems of equations, and the properties and structure of the number system. New topics include matrices, determinants, the conic sections, functions and their inverse, the trigonometric and circular functions and their graphs, sequences and series, exponential and logarithmic functions, the complex number system, and polynomial functions and equations.

HONORS ALGEBRA 2

2 Semesters
1 Credit
Grades: 9, 10
Prerequisite: Advanced Geometry and teacher recommendation
Graded: Conventional

This course reviews and extends the algebraic concepts introduced in Algebra 1 and Geometry, including further study of relations and functions, linear and quadratic equations, inequalities, systems of equations, and the properties and structure of the number system. New topics include variation, matrices, determinants, conic sections, functions and their inverses, the trigonometric and circular functions and their graphs, sequences, exponential and logarithmic functions, the complex number system, and polynomial functions and equations. The course includes enrichment topics and the assignment of special projects to challenge students.

FINANCIAL ALGEBRA

2 Semesters
Prerequisite: Algebra 2 or Adv. Algebra 2
Grades: 11, 12

1 Credit

Graded: Conventional

Graded: Conventional

Financial Algebra is an algebra-based technology and project-oriented program. The mathematics necessary for daily living is embedded in the content that directly relates to financial decisions adults make in their daily lives. The mathematical formulas, functions and graphical representations used in the course assist students in making sense of the financial world around them through mathematical modeling and equip them with the ability to make sound financial decisions based on data.

The precalculus sections in this course provide the opportunity for students to thoroughly study the behavior of many functions including polynomial, exponential, logarithmic, rational, irrational, trigonometric, absolute value, and step functions. They will also informally investigate the traditional concepts of calculus, such as maxima, minima, infinite sequences, limits, derivatives, and integrals. In addition, students work with the algebraic manipulations they will need in future courses. All this is continually applied to and illustrated by real-world applications of the topics. The Discrete Mathematics sections are recognized as vital for students in a world evermore dependent on the use of computers. As finite, discrete machines, computers (and computer technology) call for additional emphasis on discrete mathematics topics, such as formal logic, recursion, mathematical induction, combinatorics, and graph theory. In this course, students study these and other topics in applications they can understand and see as valuable.

ALGEBRA 3

2 Semesters

1 Credit

Prerequisite: Adv. Algebra 2 or Algebra 2

and teacher recommendation

Graded: Conventional

Grades: 11, 12

Algebra 3 is an alternative for those students who do not feel ready for the pace and abstraction of the Functions, Statistics and Trigonometry course. The course reviews and extends the algebraic concepts explored in Algebra 2 (Basic Algebra 2) including further study of linear equations and functions, matrices, vectors, trigonometry, sequences, series, conics probability, and descriptive statistics. It is recommended that this course be followed by the FST course for a college preparatory student.

HONORS PRECALCULUS AND DISCRETE MATHEMATICS (HONORS PDM)

2 semesters

1 Credit

Prerequisite: Honors FST, FST, or

teacher recommendation

Graded: Conventional

Grades: 11, 12

FUNCTIONS, STATISTICS, AND TRIGONOMETRY (FST)

2 Semesters

1 Credit

Prerequisite: Hon. Algebra 2, Adv. Algebra 2

or Algebra 3 and teacher recommendation

Graded: Conventional

Grades: 10, 11, 12

This course integrates functions and trigonometry with statistics and data analysis. Functions studied include: linear, quadratic, exponential, logarithmic, power, polynomial and trigonometric, as well as transformations of the given functions. Trigonometry and trigonometric graphs, identities, laws, and their practical applications are studied. All types of functions studied model real world situations and are used to interpolate and extrapolate possible outcomes. Other topics studied include sequences, series, combinatorics, probability, matrices and conic sections. Due to the technological focus of the course, a graphing calculator with statistical capabilities is used regularly.

The precalculus section of this course provides the opportunity for students to thoroughly study the behavior of many functions including polynomial, exponential, logarithmic, rational, irrational, trigonometric, absolute value, and step functions. In addition, students will develop the algebraic skills necessary to investigate concepts of calculus. Some of these concepts include: extrema, infinite sequences, limits, differential calculus and integral calculus, polar, parametric, and vector forms of equations will also be analyzed. The discrete mathematics section, so vital for students in a world dependent on the use of computers may include formal logic, mathematical induction, combinatorics, and graph theory. Additional enrichment topics will be determined by the teacher.

ADVANCED PLACEMENT CALCULUS (AB)

2 semesters

1 Credit

Prerequisites: Honors PDM, or PDM and teacher

recommendation

Graded: Conventional, weighted

Grades: 12

BLOCK ADVANCED ALGEBRA 2 + FST

2 Semesters/2 Periods

2 Credits

Prerequisite: Advanced Geometry

and teacher recommendation

Graded: Conventional

Grades: 10, 11

This course is designed for students who wish to accelerate through the high school mathematics curriculum, Block Algebra 2/FST is offered during two consecutive class periods for the entire year. Students must complete both semesters to receive credit for both Algebra 2 and FST, as the content is interspersed throughout. Due to the fast-paced nature of the course, attendance and completing homework are essential to success.

AP Calculus AB is a college level course which prepares students for the AP exam given in May. Emphasis is placed on the theoretical aspects of the calculus of functions of a single variable. As dictated by the AP syllabus, the topics of the course include limits, polynomial and transcendental functions, the derivative and its applications, the definite integral and its applications, slope fields, and the techniques of integration. Students benefit from spending more time on these topics than would be allotted in most calculus courses taken in college. Students in the course will need a programmable graphing calculator (TI-84 is recommended). This technology is an integral part of the course curriculum. Students may expect the amount of work in this class to be equivalent to taking a college calculus class.

ADVANCED PLACEMENT CALCULUS (BC)

2 semesters

1 Credit

Prerequisites: Honors. PDM and

teacher recommendation

Graded: Conventional, weighted

Grades: 12

HONORS FUNCTIONS, STATISTICS AND TRIGONOMETRY

2 semesters

1 Credit

Prerequisite: Honors Algebra 2 or

Advanced Algebra 2 with teacher recommendation

Graded: Conventional

Grades: 10, 11

This course integrates functions and trigonometry with statistics and data analysis. Functions studied include: linear, quadratic, exponential, logarithmic, power, polynomial and trigonometric, as well as transformations of the given functions. Trigonometry and trigonometric graphs, identities, laws, and their practical applications are studied. All types of functions studied model real world situations and are used to interpolate and extrapolate possible outcomes. Other topics studied include sequences, series, combinatorics, probability, matrices and conic sections. Due to the technological focus of the course, a graphing calculator with statistical capabilities is used regularly. Students should assume this course will move at a faster pace but not necessarily have more homework than the regular course. This course includes enrichment topics and challenging projects for talented and interested students.

Advanced Placement Calculus BC is offered to the student who has taken a sequence of honors mathematics classes through Honors PDM and likes the challenge of a faster paced math course. Calculus BC includes all the topics of Calculus AB plus additional topics, including divergent and convergent series, Taylor series, MacLaurin series, Euler's methods, and slope fields. Students who sign up for Calculus BC should intend to take the AP exam in May.

INDEPENDENT STUDY IN MATHEMATICS

1 semester

1/4 to 1/2 Credit

Repeatable up to 2 credits

Prerequisites: Written proposal and

permission of department

Graded: Conventional or pass/fail

based on 160 hrs/unit

PRECALCULUS AND DISCRETE MATHEMATICS (PDM)

2 semesters

1 Credit

Prerequisite: Honors FST, FST or

teacher recommendation

Grades: 11, 12

Independent Study in Mathematics is offered to enable a student to receive credit for an in-depth study of selected topics beyond those normally covered in the mathematics classroom. Faculty assistance and departmental facilities are available to the student as resources. The student is expected to keep detailed records of his/her own progress and to work directly with a member of the Mathematics

Department. Credit for the study will be granted upon the successful completion of the agreed-upon objectives of the initial proposal. The amount of credit will be determined based upon the recommendation of the supervising teacher.

Computer Programming

INTRODUCTION TO COMPUTER PROGRAMMING 1

Grades: 9,10 11,12
1 Semester Prerequisites: Concurrent Geometry
1/2 Credit Graded: Conventional or pass/fail

Introduction to Computer Programming 1 provides an introduction to computer programming. Visual Basic is an event-driven language that includes a window's interface with corresponding code. The students learn in a lab/seminar setting, developing programs to solve a variety of problems. Topics include computer components, interface design, and structured program design, including sequence, decision-making and repetition. No previous programming experience is required. Any student interested in computer programming is encouraged to enroll.

INTRODUCTION TO COMPUTER PROGRAMMING 2

Grades: 9,10,11,12
1 Semester Prerequisites: Intro to Comp. Prog. 1 and
1/2 Credit recommendation
Graded: Conventional or pass/fail

Introduction to Computer Programming 2 provides a second course in Visual Basic programming. Topics include arrays, file management, graphics, additional control objects and an introduction to the concept of object-oriented programming through the study of classes. This course provides a foundation for continued study of computer languages.

INTRODUCTION TO JAVA

Grades: 10,11,12
1 Semester Prerequisite: Algebra 2
or concurrent
Graded: Conventional or Pass/fail

Students receive an introduction to the JAVA language in a lab/seminar setting while developing programs for curricular and non-curricular applications and problem solving. Topics include computer systems, program design/implementation and analysis, testing and debugging, JAVA basics, object oriented abstractions, pre-defined and programmer –defined functions, I/O, classes and abstract data types, branching, looping, and ADT's.

ADVANCED PLACEMENT COMPUTER SCIENCE (JAVA)

Grades: 11,12
2 Semesters Prerequisites: Intro to Java or
1 Credit Intro to Comp. Programming 2
concurrent FST or Algebra 3
Graded: Conventional, weighted for AP

AP Computer Science is for those interested in extending study of the JAVA Language with the intent of taking the Advanced Placement Computer Science Test. Lab work is intensive and may require time beyond the regular class period. Additional topics covered include classes, recursion, array lists, inheritance, and arrays.