





Mathematics

Lynn Scanlon, Chair lscanlon@hfhighschool.org 335-5710

Homewood-Flossmoor
High School

H-F Academic
School Year 2011-2012

Program Rationale

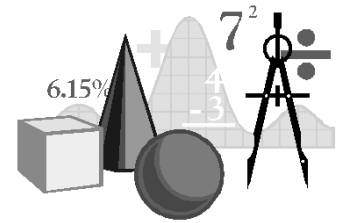
The Mathematics Department of Homewood-Flossmoor High School strongly believes that all students should have the opportunity to learn mathematical concepts and skills necessary to prepare them for any post secondary experience. It is our expectation that students will reach their highest level of mathematics by utilizing critical thinking skills, engaging in exploration and discovery activities, and solving complex problems. To accomplish this, teachers will implement various learning strategies and techniques, employ technology, and evaluate student progress using multiple forms of assessment.



Program Goals

Students will...

1. Increase their ability to visualize, describe and analyze situations in mathematical terms;
2. Utilize a variety of learning strategies;
3. Employ technology to increase their ability to solve mathematical challenges;
4. Demonstrate their learning through multiple forms of assessment.



Course Goals

Students will...

1. Build on their prior mathematical knowledge;
2. Incorporate critical thinking activities on a regular basis;
3. Explore and discover mathematical concepts and procedures;
4. Use technology widely and responsibly to further basic understandings and perceptions;
5. Make, explore, and justify conjectures using technology;
6. Demonstrate clearly and completely their knowledge of mathematics;
7. Extend their overall engagement with mathematics.



Special points of interest:

Advanced Placement Courses

- AP Calculus AB
- AP Calculus BC
- AP Computer Science (Java 1)
- AP Computer Science (Java 2)
- AP Statistics



Mathematics

Course Sequence

Course Sequence

Algebra

Honors 3300
College Prep 3210
Double Block 3201
Academic Core 3141

Geometry

Honors 3310
College Prep 3320
Double Block 3325
Academic Core 3161

Algebra 2/ Trigonometry

Honors 332
College Prep 3231
Double Block 3230
Academic Core 3226

Pre-Calculus

Honors 3331
College Prep 3241
Principles CP 3235

AP Calculus

AB 3337/3336
BC 3340/3341

Electives

AP Statistics

Honors 3332
AP 3334

AP Computer Science 1&2

Honors 3495/3496
AP 3493/3494

Introduction to Computer Science

Honors 3391

Advanced Math Topics

Honors 3351

NOTE: Based on class performance, sequences may be altered.

Mathematics

| Code | Title-Level | Year | Credit | Prerequisite | Grade |
|-----------|---|------|--------|--------------|---------|
| 3140 | Algebra I – AC | 1 | 1 | Yes | 9 |
| 3161 | Geometry – AC | 1 | 1 | Yes | 10 |
| 3201 | Algebra I Double Block - CP | 1 | 2 | Yes | 9 |
| 3210 | Algebra I – CP | 1 | 1 | Yes | 9 – 12 |
| 3220 | Geometry – CP | 1 | 1 | Yes | 9 – 12 |
| 3225 | Geometry Double Block – CP | 1 | 2 | Yes | 10 |
| 3226 | Algebra2/Trigonometry – AC | 1 | 1 | Yes | 11-12 |
| 3230 | Algebra II/Trigonometry Double Block - CP | 1 | 1 | Yes | 11-12 |
| 3231 | Algebra 2/Trigonometry – CP | 1 | 1 | Yes | 9 – 12 |
| 3235 | Principles of Pre-Calculus – CP | 1 | 1 | Yes | 11 - 12 |
| 3241 | Pre-Calculus – CP | 1 | 1 | Yes | 9 – 12 |
| 3300 | Algebra I – H | 1 | 1 | Yes | 9 |
| 3310 | Geometry – H | 1 | 1 | Yes | 9 – 10 |
| 3321 | Algebra 2/Trigonometry – H | 1 | 1 | Yes | 9 – 11 |
| 3331 | Pre-Calculus – H | 1 | 1 | Yes | 9 – 12 |
| 3332/3334 | AP Statistics - H | 1 | 1 | Yes | 10 - 12 |
| 3336/3337 | AP Calculus AB – H | 1 | 1 | Yes | 10 – 12 |
| 3340/3341 | AP Calculus BC – H | 1 | 1 | Yes | 10 – 12 |
| 3351 | Advanced Math Topics- H | 1 | 1 | Yes | 11-12 |
| 3391 | Introduction to Computer Science – H | 1 | 1 | Yes | 10 - 12 |
| 3493/3495 | AP Computer Science Using JAVA 1 – H | .5 | .5 | Yes | 9 – 12 |
| 3494/3496 | AP Computer Science Using JAVA 2 – H | .5 | .5 | Yes | 9 – 12 |

Lynn Scanlon
 Department Chair
 Ext. 5710



- The study of mathematics is cumulative. Therefore, success in mathematics depends on commitment to regular and consistent study.
- Credit must be earned in both semesters of a full year course before taking the next course in the series.
- Due to increased use of technology in mathematics all students must have a graphing calculator. A TI-83, TI-83 plus, TI-84, or TI-84 Plus is required.
- Only after careful consideration by the student, parent, teacher and counselor, should a change be made to a different level. Also, once a student has enrolled in a particular level, there is no guarantee that the student will be able to change levels at a later date.
- The minimum requirement for graduation is successful completion of Algebra 1, Geometry, and Algebra 2/Trigonometry.
- Prerequisites can be met with department chair consent in some cases.
- Honors math at H-F is rigorous and fast-paced. Students at this level should be highly motivated, be able to work independently, and complete all assignments on time.

| | | |
|---|---|---|
| Algebra 1 Level: Prerequisite: Open To: Length: Credit: | 3140 Academic Core Recommendation Freshmen Year 1 | The course focuses on the fundamental properties of real numbers, linear equations and inequalities, functions and graphs, systems of linear equations, exponents, operations with polynomials, quadratic equations, and radical expressions and equations. Elementary probability and statistics are also introduced. The course concentrates on developing skills in note-making, reading of the text, and using the graphing calculator. <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> |
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| Algebra 1 Double Block Level: Prerequisite: Open To: Length: Credit: | 3201 College Prep Recommendation Freshmen Year 2 (Algebra 1 and Math Elective) | Algebra 1 CP Double Block follows the same curriculum as Algebra I CP. Students receive two periods of instruction. The course focuses on the fundamental properties of real numbers, linear equations and inequalities, functions and graphs (linear, absolute value, exponential and quadratic), linear regression, systems of linear equations, exponents, operations with polynomials, quadratic equations, and radical expressions and equations. Elementary probability and statistics are also introduced. The course concentrates on developing skills in note-making, reading of the text, and using the graphing calculator. <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> |
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Mathematics

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|---|--|--|
| Algebra 1 Level: Prerequisite: Open To: Length: Credit: | 3220 College Prep Recommendation Freshmen Year 1 | The course focuses on the fundamental properties of real numbers, linear equations and inequalities, functions and graphs (linear, absolute value, exponential and quadratic), linear regression, systems of linear equations, exponents, operations with polynomials, quadratic equations, and radical expressions and equations. Elementary probability and statistics are also introduced. The course concentrates on developing skills in note-making, reading of the text, and using the graphing calculator. |
| <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> | | |
| Algebra 1 Level: Prerequisite: Open To: Length: Credit: | 3300 Honors Recommendation Freshmen Year 1 | Algebra I Honors is extremely rigorous and fast-paced. Students will study in depth intermediate algebra and should have a strong algebra background. This course covers all the topics covered in Algebra 1 CP, but with greater depth. Additional topics consist of rational expressions and equations and linear equations related to triangles. |
| <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> | | |
| Geometry Level: Prerequisite: Open To: Length: Credit: | 3161 AC 2 semesters of Algebra 1 AC Teacher Recommendation Sophomores Year 1 | Geometry focuses on fundamental concepts of Euclidean geometry and the development of an axiomatic system using deductive reasoning. Special attention is given to the concepts of congruence, similarity, area, volume, perpendicularity, parallelism, and coordinate geometry. Properties of lines, angles, triangles, quadrilaterals, circles and right triangle trigonometry are also studied. The course concentrates on continuing the development of skills in note-making, reading of the text, and using the graphing calculator. |
| <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> | | |
| Geometry Level: Prerequisite: Open To: Length: Credit: | 3220 College Prep 2 semesters of Algebra 1 CP Fr., Soph, Jr., Sr. Year 1 | This course focuses on fundamental concepts of Euclidean geometry and the development of an axiomatic system using deductive reasoning. Special attentions is given to the concepts of congruence, similarity, area, volume, perpendicularity, parallelism, and coordinate geometry. Properties of lines, angles, triangles, quadrilaterals, circles and right triangle trigonometry are also studied. The course concentrates on continuing the development of skills in note-making, reading of the text, and using the graphing calculator. |
| <i>A graphing calculator is required, preferable TI-83, TI-83+, TI-84, or TI-84+.</i> | | |
| Geometry Double Block Level: Prerequisite: Open To: Length: Credit: | 3225 College Prep 2 semesters of Algebra 1 CP Sophomores Year 2 (Geometry and Math Elective) | Geometry CP Double Block follows the same curriculum as Geometry CP. Students receive two periods of instruction. The course focuses on fundamental concepts of Euclidean geometry and the development of an axiomatic system using deductive reasoning. Special attention is given to the concepts of congruence, similarity, area, volume, perpendicularity, parallelism, and coordinate geometry. Properties of lines, angles, triangles, quadrilaterals, circles and right triangle trigonometry are also studied. The course concentrates on continuing the development of skills in note-making, reading of the text, and using the graphing calculator. |
| <i>A graphing calculator is required, preferable TI-83, TI-83+, TI-84, or TI-84+.</i> | | |
| Geometry Level: Prerequisite: Open To: Length: Credit: | 3310 Honors 2 semesters of Algebra 1 H or Teacher Recommendation Fr., Soph. Year 1 | This course is extremely rigorous and fast-paced. Students should have a very strong algebra background. Also, students should be highly motivated and be able to work independently. This course covers all the topics of Geometry College Prep, but in greater depth. More emphasis is placed upon precision in language, proofs by direct and indirect methods and algebraic techniques. Additional topics include three-dimensional geometry and three-dimensional coordinate systems. |
| <i>A graphing calculator is required, preferable TI-83, TI-83+, TI-84, or TI-84+.</i> | | |

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|---|---|---|
| Algebra 2/ Trigonometry | 3226 | Emphasizing real world applications and associated graphical analysis, topics include operations on real numbers and variables, solving equations, graphing, polynomials, functions, complex numbers systems of equations, rational expressions, exponential and logarithmic functions, probability and statistics, and trigonometry. The course concentrates on continuing the development of skills in note-making, reading of the text, and using the graphing calculator. <i>A graphing calculator is required: TI-83+, TI-84, or TI-84+.</i> |
| Level: | AC | |
| Prerequisite: | Algebra 1 AC, Geometry AC, or Teacher Recommendation | |
| Open To: | Jr., Sr. | |
| Length: | Year | |
| Credit: | 1 | |
| <hr/> | | |
| Algebra 2/ Trigonometry Double Block | 3230 | Algebra II/Trigonometry Double Block follows the same curriculum as Algebra II/Trigonometry CP. Students receive two periods of instruction. This course expands the material studied in Algebra I and Geometry, emphasizing real world applications and associated graphical analysis. Topics studied include operations on real numbers and variables, solving equations, graphing, polynomials, functions, complex numbers, matrices, systems of equations, rational expressions, exponential and logarithmic functions, probability and statistics, and trigonometry. <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> |
| Level: | CP | |
| Prerequisite: | 2 semesters of Geometry CP | |
| Open To: | Jr., Sr. | |
| Length: | Year | |
| Credit: | 1 | |
| <hr/> | | |
| Algebra 2/ Trigonometry | 3231 | This course expands the material studied in Algebra 1 and Geometry, emphasizing real world applications and associated graphical analysis. Topics studied include operations on real numbers and variables, solving equations, graphing, polynomials, functions, complex numbers, matrices, systems of equations, rational expressions, exponential and logarithmic functions, probability and statistics, and trigonometry. <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> |
| Level: | College Prep | |
| Prerequisite: | 2 semesters of Geometry CP | |
| Open To: | Fr., Soph., Jr., Sr. | |
| Length: | Year | |
| Credit: | 1 | |
| <hr/> | | |
| Algebra 2/ Trigonometry | 3321 | This course is extremely rigorous and fast-paced. Students should have a very strong algebra and geometry background. Also, students should be highly motivated and be able to work independently. This course covers all the topics of Algebra 2/Trigonometry CP, but in greater depth. Additional topics include trigonometry, rational functions, theory of equations, counting techniques and probability. <i>A graphing calculator is required: TI-83, TI-83+, TI-84, or TI-84+.</i> |
| Level: | Honors | |
| Prerequisite: | 2 semesters of Geometry H or Teacher Recommendation | |
| Open To: | Fr., Soph., Jr. | |
| Length: | Year | |
| Credit: | 1 | |
| <hr/> | | |
| Principles of Pre-Calculus | 3235 | This course is designed for students who would like to strengthen their trigonometry knowledge base before enrolling in a Calculus course. Topics include functions (linear, quadratic, absolute value, square root, and cubic) and their graphs, trigonometric functions, polynomial functions, rational functions, mathematical inductions, arithmetic sequences and series, and geometric sequences and series. <i>A graphing calculator is required: TI-83, TI-83+, TI-84, TI-84+.</i> |
| Level: | College Prep | |
| Prerequisite: | 2 semesters of Algebra 2/Trig CP | |
| Open To: | Jr., Sr. | |
| Length: | Year | |
| Credit: | 1 | |
| <hr/> | | |
| Pre-Calculus | 3241 | This course is intended for students who have a strong algebra and trigonometry background. Topics include trigonometric functions and their inverses, trigonometric identities, graphs of trigonometric functions, polar coordinates, polynomial functions, rational functions, combinations and permutation, theory of equations, arithmetic and geometric progressions, mathematical induction, and parametric equations. This course prepares students to take calculus. <i>A graphing calculator is required: TI-83, TI-83+, TI-84, TI-84+.</i> |
| Level: | College Prep | |
| Prerequisite: | 2 semesters of Algebra 2/Trig CP | |
| Open To: | Fr., Soph., Jr., Sr. | |
| Length: | Year | |
| Credit: | 1 | |

Mathematics

AP Computer Science Using JAVA 1

3495*

This course and its sequel, AP Computer Science 2, together are comparable to a first semester course in a university computer science department. The JAVA language is the vehicle for implementing computer-based solutions to problems. Topics include: introduction to JAVA Applets and Applications, introduction to objects and data types, text files, control structures, GUI's, looping, recursion, 1 and 2 dimensional arrays, sorting and searching algorithms.

Level: Honors
Prerequisite: Completion of or enrollment in Algebra 2/Trig, Completion of Intro to Comp. Science or consent of instructor
Open To: Fr., Soph., Jr., Sr.
Length: Semester
Credit: .5

*Course #3493 for the class of 2014 and 2015

AP Computer Science Using JAVA 2

3496*

This course continues the study of the JAVA programming language. Topics include: designing classes, interfaces and polymorphism, inheritance, the Marine Biology Case Study, and a post College Board AP Exam topic on linked lists. Students enrolled in this course are prepared to take the Advanced Placement Computer Science "A" Exam.

Level: Honors
Prerequisite: Computer Prog. Using JAVA 1
Open To: Fr., Soph., Jr., Sr.
Length: Semester
Credit: .5

*Course #3494 for the class of 2014 and 2015

The image shows several lines of handwritten mathematical derivations on a chalkboard. The equations are:

$$\frac{\partial}{\partial \theta} M_T(\xi) = \frac{\partial}{\partial \theta} \int_{R_n} T(x) f(x, \theta) dx = \int_{R_n} \frac{\partial}{\partial \theta} T(x) f(x, \theta) dx$$
$$\frac{\partial}{\partial a} \ln f_{a, \sigma^2}(\xi_1) = \frac{(\xi_1 - a)}{\sigma^2} f_{a, \sigma^2}(\xi_1) = \frac{1}{\sqrt{2\pi\sigma}} \exp\left\{-\frac{(\xi_1 - a)^2}{2\sigma^2}\right\}$$
$$\int_{R_n} T(x) \cdot \frac{\partial}{\partial \theta} f(x, \theta) dx = M\left(T(\xi) \cdot \frac{\partial}{\partial \theta} \ln L(\xi, \theta)\right)$$
$$\int_{R_n} T(x) \cdot \left(\frac{\partial}{\partial \theta} \ln L(x, \theta)\right) \cdot f(x, \theta) dx = \int_{R_n} T(x) \left(\frac{\partial}{\partial \theta} \frac{f(x, \theta)}{f(x, \theta)}\right) f(x, \theta) dx$$
$$\frac{\partial}{\partial \theta} M_T(\xi) = \frac{\partial}{\partial \theta} \int_{R_n} T(x) f(x, \theta) dx = \int_{R_n} \frac{\partial}{\partial \theta} T(x) f(x, \theta) dx$$