



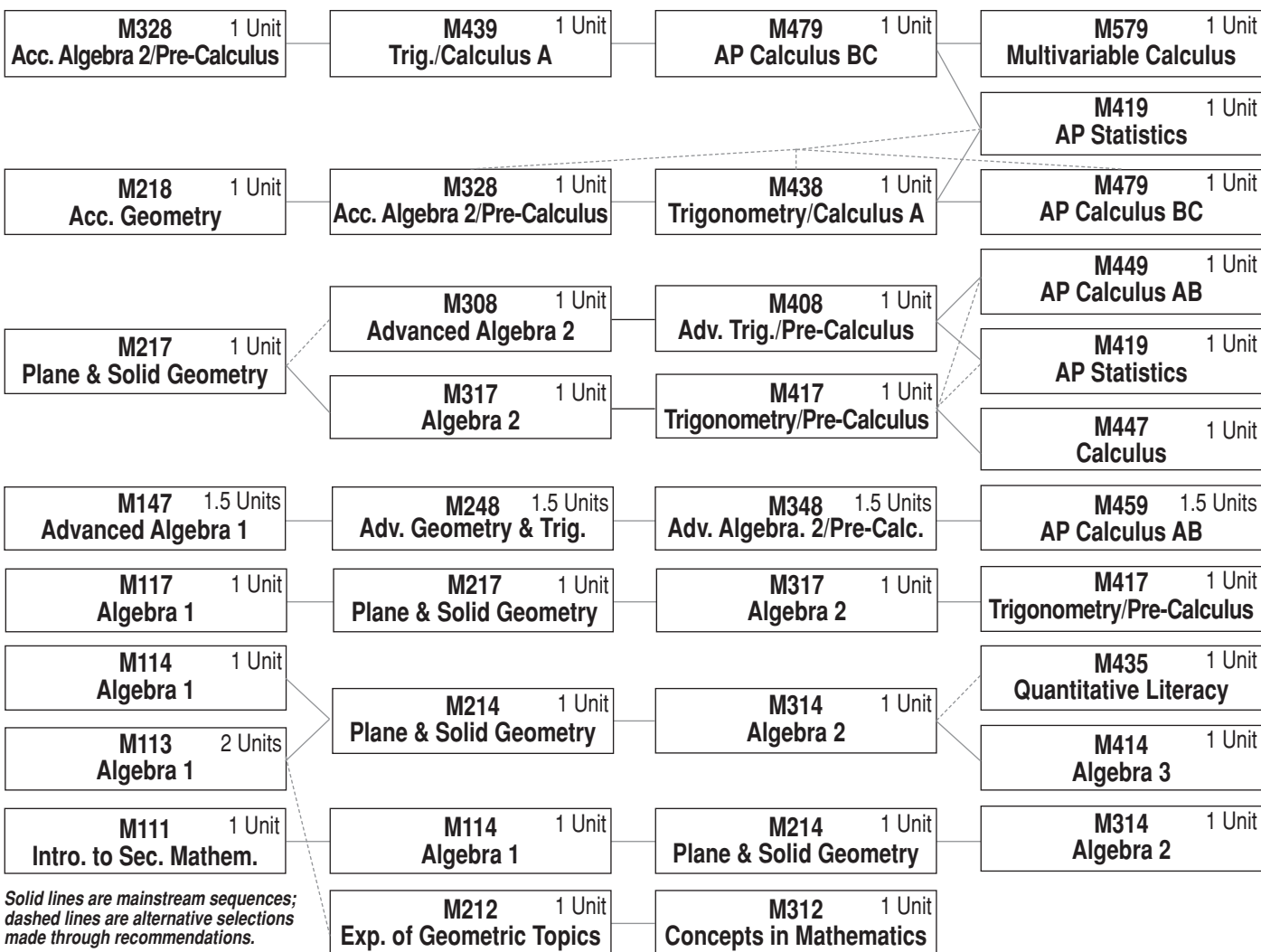
# Mathematics

## Freshman

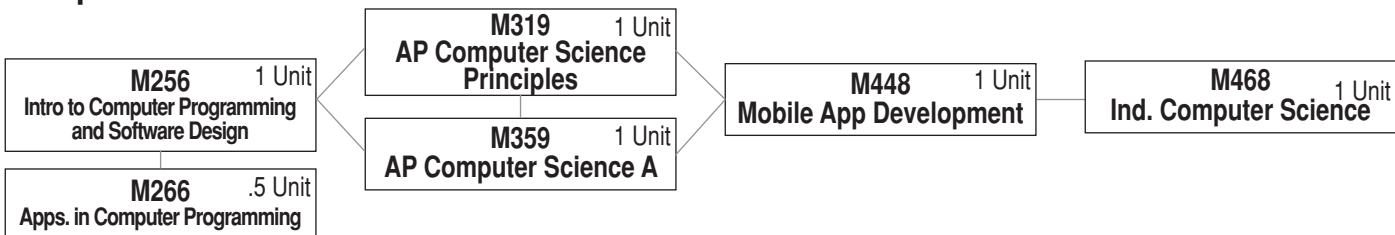
## Sophomore

## Junior

## Senior



## Computer Science Electives



All freshmen in High School District 211 enroll in a mathematics course. Placement at the freshman level is determined by entrance test scores and junior high school performance. A second year of mathematics is taken during the sophomore year and additional mathematics courses are required until the student successfully completes a 300-level course.

Freshmen who have successfully completed junior high school algebra may be placed in M217 Plane and Solid Geometry or M218 Accelerated Plane and Solid Geometry. Other freshmen may be placed in M117 Algebra 1, M114 Algebra 1, M113 Algebra I, M111 Introduction to Secondary Mathematics, M120 Essential Mathematics, or M100 Applied Mathematics 1.

A student who fails to meet the grade prerequisite for any course must repeat the requisite course to improve the grade in order to proceed to the next sequential course.

College-bound students are encouraged to complete four years of mathematics, including trigonometry.

The Mathematics Departments of High School District 211 provide honors and accelerated programs which allow students to complete up to three semesters of calculus leading to Advanced Placement examinations. Advanced Placement testing in computer science (JAVA) and statistics also are available.

### **M100 Basic Mathematical Applications**

**LEVEL: 1,2**

One year One unit  
*PREREQUISITE: Placement through staff conference recommendation.*

This course is designed to teach students basic computational and money skills to increase the student's independence in the community. Money skills, whole number operations, time, and calculator usage are emphasized.

### **M111 Introduction to Secondary Mathematics**

**LEVEL: 1,2**

One year One unit  
 This course reinforces arithmetic skills, as their mastery is essential for continued study of mathematics. Pre-Algebra skills of variable recognition, signed numbers, formulas, and single variable equations are introduced as well as beginning geometry topics.

### **M113 Algebra 1**

**LEVEL: 1,2,3**

One year Two units  
*PREREQUISITE: Acceptable performance on the entrance examination or department approval*

This course introduces students to the fundamental principles of algebra with extended instruction and practice. Algebraic symbolism, simplifying expressions, solutions to elementary equations, and the graphic representations associated with variables will be introduced. (NCAA Core Course, 1 unit)

### **M114 Algebra 1**

**LEVEL: 1,2,3**

One year One unit  
*PREREQUISITE: Acceptable performance on the entrance examination or department approval.*

This course introduces students to the fundamental principles of algebra. Algebraic symbolism, simplifying expressions, solutions to elementary equations, and the graphic representations associated with variables will be introduced. (NCAA Core Course)

### **M117 Algebra 1**

**LEVEL: 1**

One year One unit  
*PREREQUISITE: Acceptable performance on entrance examination*

This course introduces students to the fundamental principles of algebra. Algebraic symbolism, simplifying expressions, solutions to equations, and the graphic representations associated with variables are among the course topics. This course emphasizes the algebraic processes applied to word problems. (NCAA Core Course)

### **M147 Advanced Algebra 1**

**LEVEL: 1**

One year One and one-half units  
*PREREQUISITE: Acceptable performance on entrance exam*

This accelerated course is a comprehensive study of algebra including algebraic symbolism, simplifying expressions, solutions to equations, and graphic representations associated with variables. The course will also include advanced techniques of graphing, solving equations and inequities, and functions in preparation for M248 Advanced Geometry and M247 Advanced Trigonometry. This course requires a graphing calculator. (NCAA Core Course)

### **M170 Essential Mathematics**

**LEVEL: 1**

One year One unit  
*PREREQUISITE: Placement through staff conference recommendation*

This course reinforces arithmetic skills aligned to the state's performance indicators with emphasis on number operation, patterns, ratios, proportions, and estimation. Pre-algebra skills of variable recognition, formulas, and single variable equations are introduced as well as beginning Geometry concepts such as points, lines, planes, and space.

### **M212 Explorations of Geometric Topics**

**LEVEL: 2,3,4**

One year One unit  
*PREREQUISITE: M114, M113, M111*

The course exposes students to a sampling of basic geometric topics including measuring, points, lines, planes, perimeter, area, volume, similarity, congruence, polygons and transformations. This course does not meet the NCAA clearinghouse rules. Students desiring to take Algebra 2 must enroll in at least M214 to satisfy the geometry prerequisite of Algebra 2.

## M214 Plane and Solid Geometry

**LEVEL: 2,3,4**

One year One unit  
*PREREQUISITE: M113 Algebra, M114 Algebra 1, or M117 Algebra 1 (D)*

This study of geometry involves studying the axioms and theorems that relate points, lines, planes, and solids. An overview of plane and solid geometry is presented through geometric constructions, measurement formulas, and limited writing of formal proofs. (NCAA Core Course)

## M217 Plane and Solid Geometry

**LEVEL: 1, 2**

One year One unit  
*PREREQUISITE: M117 Algebra 1 (A,B,C) or acceptable performance on Algebra examinations*

This comprehensive study of plane and solid geometry includes constructions, formulas for measurement, and formal proofs. It is based on the axioms and theorems that relate points, lines, planes, and solids. Algebraic techniques are integrated into the solution of many geometric problems. (NCAA Core Course)

## M218 Accelerated Plane and Solid Geometry

**LEVEL: 1,2**

One year One unit  
*PREREQUISITE: High performance on Algebra examinations or department approval*

This accelerated course is a comprehensive study of plane and solid geometry including constructions, formulas for measurement and formal proofs. It is based on the axioms and theorems that relate points, lines, planes, and solids. Many of the topics are covered in great depth, especially area and volume of solids. Additional emphasis is placed on the integration of algebraic techniques in solving geometric problems. (NCAA Core Course)

## M248 Advanced Geometry and Trigonometry

**LEVEL: 2**

One year One and one-half units  
*PREREQUISITE: M147 (A,B,C)*

This accelerated course is a comprehensive study of plane and solid geometry including constructions, formulas for measurement and formal proof. It is based on the axioms and theorems that relate points, lines, planes, and solids. Many topics are covered in great depth, especially area and volume of solids. Additional emphasis is placed on the integration of algebra techniques in solving geometric problems. In the study of trigonometry, the student applies algebra and geometry skills to circular and periodic functions with applications in preparation for M348 Advanced Algebra 2/Pre-Calculus. This course requires a graphing calculator. (NCAA Core Course)

## M256 Introduction to Computer Science and Software Design

**LEVEL: 1,2,3,4**

One year One unit  
*PREREQUISITE: None*

Students are introduced to the fundamentals of computer science through the creation of software applications. Examples may include: games, phone apps, interactive web pages, networked programs, and interactive animations. No previous knowledge of computer programming is required. (NCAA Core Course)

## M266 Applications of Computer Programming

**LEVEL: 2,3,4**

One-half year One-half unit  
*PREREQUISITE: M256 Computer Programming: A Multimedia Approach and department approval*

Through independent study, students apply their computer programming skills to complete highly individualized projects. (NCAA Core Course)

## M270 Algebra and Geometry Concepts

**LEVEL: 2**

One year One unit  
*PREREQUISITE: Placement through staff conference recommendation*

This course reinforces skills needed for achieving early high school benchmarks of the Illinois Learning Standards. It introduces algebra concepts such as exponents, algebraic expressions, and graphing. Beginning plane and solid geometry topics are introduced.

## M296 Geometry in Construction

**LEVEL: 2**

One year One unit  
*PREREQUISITE: M114 or M117*

The purpose of this course is to have students experience putting geometry into action by building real world construction projects. Geometry in Construction is a team taught by both math and applied Technology teachers. This interdisciplinary course integrates geometry and construction topics through the building of significant construction projects. The goal is to provide students with a better understanding of both the geometry and the construction content taught in the math department, and prepares students for the subsequent math courses. Students will gain hands-on, real-world experience in



**D**o what you can, with what you have,  
 where you are.

– Theodore Roosevelt



different areas of construction. Additional emphasis is given to teamwork, problem-solving, and the promotion of employable attributes. **This is a double-period course that offers both a Math credit and an Applied Technology credit.**

### **M308 Advanced Algebra 2**      **LEVEL: 2**

One year      One unit

*PREREQUISITE: M217 with department approval*

This advanced course is designed for students who have proficient knowledge of algebra and geometry. M308 Advanced Algebra 2 will place an emphasis on questioning, summarizing, justifying, and evaluating. Ideas presented involve advanced techniques of graphing, methods of solving equations and inequalities, and functions. Students are prepared to begin their study of M408 Advanced Trigonometry/PreCalculus. This course requires a graphing calculator. (NCAA Core Course)

### **M312 Concepts in Mathematics**      **LEVEL: 3,4**

One year      One unit

*PREREQUISITE: Department chair approval and two years of credit in high school mathematics*

The course exposes students to a sampling of basic mathematical topics including percent, interpretation of data, probability, tables and graphs, polynomial operations, linear and quadratic functions. This course does not meet the NCAA clearinghouse rules. Students desiring to take Trigonometry must enroll in at least M314 to satisfy the Algebra 2 prerequisite of Trigonometry.

### **M314 Algebra 2**      **LEVEL: 3,4**

One year      One unit

*PREREQUISITE: M214 Plane and Solid Geometry*

This course reviews topics introduced in M114 Algebra 1 and expands upon them. All standard Algebra 2 topics are covered. The topics include methods of solving equations and inequalities, graphing techniques, conics, and logarithms. This course requires a graphing calculator. (NCAA Core Course)

### **M317 Algebra 2**      **LEVEL: 2,3,4**

One year      One unit

*PREREQUISITE: M117 Algebra 1 (A,B,C) and M217 Plane and Solid Geometry*

This course is designed for students who have a good knowledge of algebra and geometry. Concepts presented in earlier course work are reviewed and expanded. Ideas presented involve advanced techniques of graphing, methods of solving equations and inequalities, and functions. Students are prepared to begin their study of pre-calculus. This course requires a graphing calculator. (NCAA Core Course)

### **M319 AP Computer Science Principles**      **LEVEL: 1,2,3,4**

One year      One unit

*PREREQUISITE: Concurrent enrollment in any accelerated math course or completion of M256.*

AP Computer Science Principles offers a multidisciplinary

approach to teaching the underlying principles of computation. The course will introduce students to creative aspects of programming, using abstractions and algorithms, working with large data sets understandings of the Internet and issues of cybersecurity, and impacts of computing that affect different populations. Students will learn to use current technologies in order to solve problems and create meaningful computational artifacts. (NCAA Core Course)

### **M328 Accelerated Algebra 2/ Pre-Calculus**      **LEVEL: 1,2,3**

One year      One unit

*PREREQUISITE: M218 (A,B) or department approval*

This accelerated course is designed for students who have an excellent knowledge of algebra and geometry. M328 Accelerated Algebra 2 briefly reviews concepts presented in earlier course work and then rigorously expands and applies them to other areas of mathematics. In addition, selected topics from pre-calculus are studied. Ideas presented in this course involve advanced techniques of graphing and solving equations and inequalities and prepares students to take M439 Trigonometry/Calculus A. This course requires a graphing calculator. (NCAA Core Course)

### **M348 Advanced Algebra 2/ PreCalculus**      **LEVEL: 3**

One year      One and one-half units

*PREREQUISITE: M248 (A, B, C)*

This accelerated course rigorously expands upon the study of advanced techniques of graphing, solving equations and inequalities, functions (including circular and periodic functions), and trigonometric identities. Students will apply their skills to series and sequences, probability, statistics, limits, and derivative in preparation for M459 Advanced Placement Calculus AB. This course requires a graphing calculator. (NCAA Core Course) *M64802: Harper College Course MTH103, College Algebra, 3 college credit hours.*



**M359 Advanced Placement Computer Science A** **LEVEL: 2,3,4**

One year One unit

*PREREQUISITE: Concurrent enrollment in M328 or higher, completion of M319 or M256 (A, B, C) or department approval)*

The JAVA language allows the programmer to process data as well as perform mathematical calculations. In Advanced Placement Computer Science, data structures, programming algorithms, and structured programming are used. Students are expected to use analytical thinking in solving problems and use top-down design methods in developing programs. AP Computer Science is a strongly encouraged elective any time course prerequisites are met and can be taken in conjunction with another math class. (NCAA Core Course)

**M370 Consumer Mathematics** **LEVEL: 3, 4**

One year One unit

*PREREQUISITE: Placement through staff conference recommendation*

This course targets consumer math skills used in everyday situations such as paying taxes, purchasing a car, investing and managing a household. A full year in this course meets the state of Illinois requirement for consumer education.

**M408 Advanced Trigonometry and Pre-Calculus** **LEVEL: 3**

One year One unit

*PREREQUISITE: M308 with department approval*

This advanced course is designed to create a foundation of knowledge needed for success in an advanced placement math course senior year. In the study of trigonometry, the student will apply algebra and geometry skills to circular and periodic functions with applications. In the study of pre-calculus, students will apply their skills to series and sequences, probability, statistics, limits, and derivatives in preparation for M419 AP Statistics and M449 AP Calculus AB. This course requires a graphing calculator. (NCAA Core Course)

**M414 Algebra 3** **LEVEL: 4**

One year One unit

*PREREQUISITE: M314 Algebra 2*

This computer-based course helps better prepare students for the mathematics needed for career and college by re-enforcing the fundamental concepts of algebra including rational expressions, complex numbers, and functions that are polynomial, rational, exponential or logarithmic. The class also emphasizes mathematical reasoning and problem solving utilizing multiple approaches (algebraic, geometric, and numeric techniques) with focus on mathematical definitions, theorems, symbols, and notation. This course is aligned to the last developmental course MTH080 Foundations of Math II at Harper Community College. (NCAA Core Course)

**M435 Quantitative Literacy** **LEVEL: 4**

One year One unit

*PREREQUISITE: 22 Math ACT or ALEKS score 46 or greater or MTH 080 score 70% or higher.*

This dual enrollment course focuses on the analysis and solution of problems and includes representing and analyzing data using statistical measures, using logical reasoning in a real-world context, estimating, approximating, and judging the reasonableness of answers, and the use of appropriate approaches and tools, such as calculators and computers, in formulating and solving real-world problems. This course is aligned to MTH101 Quantitative Literacy at Harper Community College. Successful completion of the course results in college credit. *M63502: Harper College Course MTH101, Quantitative Literacy, 4 college credit hours.* (NCAA Core Course)

**M417 Trigonometry and PreCalculus** **LEVEL: 3,4**

One year One unit

*PREREQUISITE: M317 Algebra 2 (A,B,C)*

In the study of trigonometry, the student applies algebra and geometry skills to circular and periodic functions and rotational velocity. Many topics studied are developed as an extension of concepts introduced in earlier courses as a preparation for calculus. This course requires a graphing calculator. (NCAA Core Course)

**M419 Advanced Placement Statistics** **LEVEL: 2,3,4**

One year One unit

*PREREQUISITE: M328 (with concurrent enrollment in M439), or M408, M417, or M317 (with concurrent enrollment in M417), (A,B,C)*

The study of statistics is now a requirement for many university majors. Students in this class will perform statistical tests on data sets using technology in order to organize, analyze, and predict outcomes. This course will follow the guidelines of the Advanced Placement Statistics program. Students are encouraged to take the Advanced Placement exam of the College Entrance Examination Board. This course requires use of a computer and graphing calculator. (NCAA Core Course) **AP Statistics is a strongly encouraged elective any time course prerequisites are met and can be taken in conjunction with another math class.**

**M438 Trigonometry - Calculus A** **LEVEL: 2,3,4**

One year One unit

*PREREQUISITE: M328 Accelerated Algebra 2/Pre-Calculus (A,B) or department approval*

In the study of trigonometry, the student applies algebra and geometry skills to circular and periodic functions and rotational velocity. Additional time is spent on extending the trigonometry identities in the first semester. The second semester study of calculus is no longer limited to those preparing for careers in mathematics and the sciences. The need and demand for students in business and social studies who can design procedures, predict and relate the principles of higher mathematics are increasing dramatically. This

*It's the possibility of having a dream come true that makes life interesting.*

*- Paulo Coelho  
Alchemist*

course emphasizes the applications of differentiation. It is the first of three semesters of college-level calculus and satisfies the requirements for the first semester of calculus suggested by the Advanced Placement Program of the College Entrance Examination Board. This course requires use of a graphing calculator. (NCAA Core Course)

### **M447 Calculus** **LEVEL: 4**

One year One unit  
*PREREQUISITE: M417 Trigonometry and Pre-Calculus (A,B,C) or department approval*

The study of calculus is no longer limited to those preparing for careers in mathematics and sciences. This course emphasizes the skills of differentiation and integration. These students will not qualify for the Calculus AB Advanced Placement Examination. This course requires a graphing calculator. (NCAA Core Course)

### **M448 Mobile Application Development** **LEVEL: 2,3,4**

One year One unit  
*PREREQUISITE: Completion or concurrent enrollment in M319 or M359 or department chair approval*

Students will complete a study of Mobile App development including rapid iterative prototyping. The differences between Web Apps and Native Apps will be highlighted with relationship to the many deployment platforms available. Commonly accepted UI standards will be highlighted for each deployment platform. Students will use agile development techniques to produce quality apps with the intent of making them available to the public. (NCAA Core Course)

### **M449 Advanced Placement Calculus AB** **LEVEL: 4**

One year One unit  
*PREREQUISITE: M328 Accelerated Algebra 2/Pre-Calculus (A,B) and Trigonometry, M417 Trigonometry, and Pre-Calculus (A), or M408*

The study of calculus is no longer limited to those preparing for careers in mathematics and the sciences. The need and demand for students in business and social studies who can design procedures, predict, and relate the principles of higher mathematics are increasing dramatically. This course emphasizes the various types and applications of differentiation and integration. Students are encouraged to take the Calculus AB Advanced Placement Exam of the College Entrance Examination Board. This course requires use of a graphing calculator. (NCAA Core Course)

### **M459 Advanced Placement Calculus AB** **LEVEL: 4**

One year One and one-half units  
*PREREQUISITE: M348 (A, B, C)*

This accelerated course is the high school equivalent to one semester of college-level calculus. The student is provided additional support in advanced algebra and pre-calculus and prepared to enter college with a strong calculus background. Students are encouraged to take the Calculus AB Advanced Placement Exam. This course requires a graphing calculator. (NCAA Core Course)

### **M468 Independent Computer Science** **LEVEL: 3-4**

One year One unit  
*PREREQUISITE: M319, M359 or department chair approval.*

Students complete an independent computer science project beyond M359 curriculum in a supportive environment. Projects will be designed and developed through consultation with the student's advisor (teacher) who will act as advisor/consultant throughout the project. (NCAA Core Course)

### **M479 Advanced Placement Calculus BC** **LEVEL: 3,4**

One year One unit  
*PREREQUISITE: M439 Trigonometry-Calculus A (A,B) or department approval*

This course emphasizes applications of differentiation and integration in relationship to topics from trigonometry and college algebra. Calculus BC concludes the three-semester high school equivalent to two semesters of college-level calculus. The student is prepared to enter college with a strong calculus background. Students are encouraged to take the Calculus BC Advanced Placement Exam of the College Entrance Examination Board. This course requires a graphing calculator. (NCAA Core Course)

### **M578 Multivariable Calculus** **LEVEL: 3,4**

One year One unit  
*PREREQUISITE: M479 AP Calculus score of 4 or 5*

This course is the equivalent to a third course in calculus and analytic geometry including: vector analysis, Euclidean space, partial differentiation, multiple integrals, line and surface integrals, and the integral theorems of vector calculus. M67802: Students with AP Calculus BC scores of 4 or 5 are eligible to enroll in optional University of Illinois credit option at a cost of \$300. (NCAA Core Course)

### **M588 Independent Study Math** **LEVEL: 3,4**

One year One unit  
*PREREQUISITE: M579 (A,B) and department chair approval*

Students complete an independent project beyond M579. Projects will be determined through consultation with the student's advisor (teacher) who will act as the advisor/consultant throughout the project. M68802: Eligible students may enroll in optional University of Illinois credit option at a cost of set by the university (\$800-\$1,100). (NCAA Core Course)

