

MATHEMATICS DEPARTMENT

PHILOSOPHY OF THE DEPARTMENT It is the belief of the Mathematics staff of Utica Community Schools that mathematics is one of the fundamental skills of learning. The basics of mathematics, along with other essential communication skills, are ingredients that cannot be excluded from any student's formal training.

We recognize qualitative literacy as being necessary for survival in a rapidly changing technological society. It is therefore agreed that despite the differences that exist in learning potential or individual student's achievement, there are certain common goals for all students in mathematics: the development of problem-solving and critical thinking skills; the facility to analyze data, make quantitative and qualitative comparisons, identify trends, and make valid conclusions and predictions; the capacity to make estimates and recognize reasonable results; and the appropriate utilization of related equipment such as calculators and computers and the ability to adapt to new technology.

We regard the skills of mathematics as part of being an educated person and critical to post-secondary training and employment. Furthermore, we consider cooperation with parents, the community, industry, and those in higher education essential in the development and delivery of a mathematics program which effectively educates our children and communicates the need for this education to all.

Goals and Objectives

In accordance with the stated philosophy of the Utica Community Schools Mathematics Department and the standards recommended by the National Council of Teachers of Mathematics, the mathematics staff strives to meet the following objectives:

- A. To encourage critical thinking and to help students learn to reason objectively and analytically;
- B. To promote the development of problem-solving skills;
- C. To provide a meaningful mathematics course for students which is consistent with the learner's mathematics aptitude, past achievement, and future requirements;
- D. To maintain a program of study which is consistent with expectations of the workplace and post-secondary training programs; and
- E. To offer relevant computer training to as many students as possible, and utilize technology as an integral component in classroom instruction whenever feasible.

MATHEMATICS DEPARTMENT

LEVEL	COLLEGE PREPARATORY	COLLEGE/CAREER PREPARATORY	DEVELOPMENTAL MATHEMATICS
1			Transition Mathematics
2		Algebra I	Applied Algebra
3	Geometry	Geometry	Applied Geometry
4	Accelerated Algebra II	Algebra II	Applied Algebra B or
5	Accelerated Trigonometry and Analytical Geometry	Trigonometry and Analytical Geometry	Applied Trigonometry and Statistics
6	Advanced Placement Calculus	Intro to Calculus and Discrete Mathematics	

NOTES:

- * The Mathematics Department offers courses in computer science which do not appear in the above diagram. These courses may not be used for mathematics credit toward graduation. See the course descriptions below, or refer to computer courses in another part of this booklet for additional information.
- * Students are encouraged to enter and remain as far left as possible in the flow diagram illustrated above. In the event of academic difficulties, a successful transfer to the right is always possible; a successful transfer to the left is highly unlikely.
- * Once a student receives credit at a level, he/she may not take a class at a lower level.

COLLEGE AND CAREER PREPARATORY PROGRAM

E090

ALGEBRA I

2 semesters

1 credit

9-12

PREREQUISITE: Previous mathematics grades of "C" or better and teacher recommendation

Algebra I is a one-year college/career preparatory course which includes the study of arithmetic operations with algebraic expressions, factoring polynomials, graphing and solving linear equations and inequalities, graphing and solving elementary quadratic equations, and simplifying algebraic expressions containing radicals. This course is mandatory for students planning scientific and/or technical careers and is strongly recommended for any capable student intending to pursue post-secondary education.

E110

GEOMETRY

2 semesters

1 credit

9-12

PREREQUISITE: Successful completion of Algebra I with at least a "C" average and teacher recommendation or concurrent with Algebra II and teacher recommendation

Geometry is a one-year college/career preparatory course which includes the study of the axiomatic method; similarity and congruence; proofs pertaining to triangles, quadrilaterals, other polygons, and circles; geometric constructions; geometric formulas; and an introduction to coordinate geometry. This course is mandatory for students planning scientific and/or technical careers and is strongly recommended for any capable student intending to pursue post-secondary education.

E120

ALGEBRA II

2 semesters

1 credit

10-12

PREREQUISITE: Successful completion of Algebra I and Geometry with at least a "C" average or concurrent with Geometry and teacher recommendation

Algebra II is a one-year college/career preparatory course which includes the study of quadratic functions, conic sections, elementary applications of matrices and determinants, logarithms and exponential functions, higher degree polynomials, and complex numbers. This course is mandatory for students planning scientific and/or technical careers and is strongly recommended for any capable student intending to pursue post-secondary education.

Students with an "A" average in Algebra I who desire to enroll in Introduction to Calculus and Discrete Mathematics or Advanced Placement Calculus (AB) during their senior year may consider enrolling in Algebra II and Geometry simultaneously during their sophomore year.

E140

TRIGONOMETRY/ANALYTIC GEOMETRY 2 semesters 1 credit 11-12

PREREQUISITE: Successful completion of Geometry and Algebra II with at least a "C" average and teacher recommendation

Trigonometry is the study of the measurement of triangles and the six mathematical functions related to right triangles and the unit circle. The topics of study in the course include the trigonometry of right triangles and oblique triangles, circular functions and their corresponding graphs, periodic functions, inverses of trigonometric functions, verifying trigonometric identities, and finding solutions of trigonometric equations.

Analytic Geometry is the study of the relationship between algebraic equations and their corresponding graphs. The topics included in the course are vectors, general forms of linear equations, a formal treatment of conic sections, polar coordinates, and curve sketching of higher degree polynomial and rational expressions. The Trigonometry/Analytic Geometry course is strongly recommended for students intending to continue formal study beyond high school.

E160

INTRODUCTION TO CALCULUS AND DISCRETE MATHEMATICS
2 semesters 1 credit 12

PREREQUISITE: Successful completion of Trigonometry and Analytic Geometry

Introduction to Calculus and Discrete Mathematics is a rigorous one-year college preparatory course which includes the study of symbolic logic and methods of mathematical proof, the structure of mathematical systems, concepts of linear algebra, a formal treatment of functions, an introduction to the calculus, and selected discrete mathematics topics traditionally offered in senior-level pre-college mathematics courses. The course is strongly recommended for students intending to continue formal study beyond high school. The course is appropriate for all future college students, but is especially important for those planning professional careers in engineering, medicine, computer science, business, law, or most technical vocations.

E161

ADVANCED PLACEMENT CALCULUS (AB) 2 semesters 1 credit 11-12

PREREQUISITE: Successful completion of Trigonometry / Analytic Geometry and teacher recommendation

Advanced Placement Calculus is designed for the student in the accelerated mathematics program. The topics of instruction focus on differential and integral calculus. Students have the opportunity to take the Advanced Placement Calculus (AB) Examination for possible college credit.

DEVELOPMENTAL MATHEMATICS PROGRAM

E050

TRANSITION MATHEMATICS

2 semesters 1 credit 9

PREREQUISITE: Unable to meet prerequisites for Algebra I and teacher recommendation.

Transition mathematics is a course designed to prepare students for the study of algebra. Arithmetic principles are consolidated and integrated with concepts from algebra and geometry. An emphasis is placed on problem-solving strategies and calculator usage in the applications of mathematics.

E060

APPLIED ALGEBRA

2 semesters 1 credit 10-12

PREREQUISITE: Successful completion of Transition Mathematics and teacher recommendation

Applied Algebra is an introductory course in the study of algebra. It is intended for students who have successfully completed Transition Mathematics and are not electing college preparatory Algebra I. The course is driven by an application and problem-solving approach to the study of algebra. The focus of the course is on basic algebraic concepts and includes probability and statistics units.

E070

APPLIED GEOMETRY

2 semesters 1 credit 11-12

PREREQUISITE: Successful completion of an algebra course and teacher recommendation

Applied Geometry is a one-year developmental mathematics course which parallels the college preparatory Geometry course, excluding the mathematics rigor of formal proof. The course includes the study of triangles, quadrilaterals, other polygons and circles, constructions, geometric formulas, and an introduction to coordinate geometry.

E075

APPLIED ALGEBRA B

2 semesters 1 credit 11-12

PREQUISITE: Successful completion of a geometry course and teacher recommendation

Applied Algebra B is designed to meet the needs of those students who wish to enhance their algebra skills after completing a geometry course and prior to taking Applied Trigonometry and Statistics. Units of study include systems of equations and functions (quadratic, polynomial, and exponential). Real world applications, computer software and graphing calculators are integrated throughout the coursework. Students who have earned credit in Algebra II are not eligible for credit in this course.

E080

APPLIED TRIGONOMETRY AND STATISTICS 2 semesters 1 credit 12

PREREQUISITE: Successful completion of Applied Algebra B or Algebra II with at least a "C" average and teacher recommendation.

Applied Trigonometry and Statistics is a one-year developmental mathematics course which parallels the college preparatory Trigonometry course, excluding mathematical rigor and formal proof. The course includes the study of the trigonometry of right triangles and oblique triangles, methods of direct and indirect measurement, similar figures and proportional parts, areas and volumes of plane and solid figures, an introduction to logarithms, and a review of significant topics from algebra and geometry. In addition, students study units pertaining to probability and statistics. The inclusion of calculators, an emphasis on laboratory techniques, and the use of measurement apparatus are fundamental to the development of the course objectives. This course is intended for students in the developmental program who wish to continue the study of mathematics beyond the Applied Algebra B course. Algebra II students who do not meet the prerequisites for the college/career preparatory Trigonometry course may also elect this course.

E135

BUSINESS MATHEMATICS 1 semester 1/2 credit 10-12

PREREQUISITE: None

This course provides the basic experience and skill in mathematics needed for jobs in the office and business occupations. Time is spent relating the fundamentals of mathematics to various business situations, office work, retailing and personal finance. This class has not been designed for the student who has taken advanced math or accounting classes.

MATHEMATICS DEPARTMENT SUPPLEMENTS

E300

PROBABILITY AND STATISTICS 1 semester 1/2 credit 11-12

This course interrelates data analysis, statistics, and probability through the methods of investigation, modeling, and simulation. Students conduct experiments and analyze and interpret data through measures of central tendency. They draw conclusions and make predictions based on data and evaluate the effectiveness of their experiments and components thereof.

E200

COMPUTER SCIENCE I 1 semester 1/2 credit 11-12

PREREQUISITE: Completion of Geometry and Algebra II with “C” average or better and teacher recommendation. (Occasional exceptions may be made for students showing outstanding potential.)

Computer Science I is an introductory course for students interested in learning the structure and logic of a formal programming language. The course is especially intended for students who may enroll in computer science courses in college. The Computer Science I course will emphasize program structure and design while developing standard programming algorithms and conventional procedures. The topics of study will include program development, functions and procedures, data structures, sorting routines with respect to efficiency, and text files and formatted output.

E210

COMPUTER SCIENCE II 1 semester 1/2 credit 11-12

PREREQUISITE: Completion of Computer Science I and teacher recommendation

Computer Science II is a continuation of the one-semester Computer Science I course. The course is designed for college-bound students who will major in a scientific or technical discipline that requires computer involvement. The course emphasizes computer science algorithms and their implementation using static and dynamic data structures. Students will study arrays in further detail. The course also will include an introduction to stacks, queues, linked lists, and binary trees. Emphasis will be on computer science topics using formal-structured program design.

E170

ADVANCED COMPUTER SCIENCE I 1 semester 1/2 credit 11-12

PREREQUISITE: Successful completion of Computer Science I and Computer Science II and teacher recommendation.

Advanced Computer Science I is designed for students who have completed the Computer Science sequence and are interested in continuing their computer science studies. The emphasis of the course is on the theory and application of data structures, writing optimal code, and participating as a member of a team to solve complex problems and write corresponding code. Students will program using a structured language.

E180

ADVANCED COMPUTER SCIENCE II

1 semester

1/2 credit

11-12

PREREQUISITE: Successful completion of Advanced Computer Science I and teacher recommendation.

Advanced Computer Science II is designed for students who have completed Advanced Computer Science I and are interested in continuing their computer science studies. The emphasis of the course is on the theory and application of data structures, writing optimal code, and participating as a member of a team to solve complex problems and write corresponding code. Students will program using a structured language.