# MATH (MTH)

### MTH 020: Pre-algebra (4)

This course begins with a review of whole number, fraction, and decimal arithmetic that includes positive exponents, rounding, estimation, and order of operations. This review is followed by an introduction to ratios, proportions, percent, measurement, basic geometry, integer operations, and a brief look at algebra. Problem solving is emphasized. Successful completion prepares the student for MTH 60: Introduction to Algebra. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk

**Terms Typically Offered:** Fall, Winter, Spring, Summer

### MTH 040: Math Studio Lab (1)

This course offers supplemental instruction during fall, winter, and spring terms. The Math Studio Lab is for students who place into MTH 20-MTH 111 but want to take a higher math class while taking this co-requisite math studio lab. The lab supports students in satisfying their math prerequisites at an accelerated pace. The studio incorporates the practice of compressing courses while being supported by an associate math professor in the lab. 1 lecture hrs/wk

**Registration-Enforced Corequisite:** MTH 020, MTH 060, MTH 065, MTH 095, MTH 111Z.

**Terms Typically Offered:** Fall, Winter, Spring

### MTH 041: Math Studio Lab (1)

This course offers supplemental instruction during fall, winter, and spring terms. The Math Studio Lab is for students who place into MTH 20-MTH 111 but want to take a higher math class while taking this co-requisite math studio lab. The lab supports students in satisfying their math prerequisites at an accelerated pace. The studio incorporates the practice of compressing courses while being supported by an associate math professor in the lab. 1 lecture hrs/wk

**Registration-Enforced Corequisite:** MTH 020, MTH 060, MTH 065, MTH 095, MTH 111Z.

**Terms Typically Offered:** Fall, Winter, Spring

### MTH 042: Math Studio Lab (1)

This course offers supplemental instruction during fall, winter, and spring terms. The Math Studio Lab is for students who place into MTH 20-MTH 111 but want to take a higher math class while taking this co-requisite math studio lab. The lab supports students in satisfying their math prerequisites at an accelerated pace. The studio incorporates the practice of compressing courses while being supported by an associate math professor in the lab. 1 lecture hrs/wk

**Registration-Enforced Corequisite:** MTH 020, MTH 060, MTH 065, MTH 095, MTH 111Z.

**Terms Typically Offered:** Fall, Winter, Spring

### MTH 052: Industrial Applications-MTH (4)

This is an introductory algebra and geometry class in professional-technical mathematics.  Topics that are covered include measurement and conversions, signed numbers, algebraic equations and formulas, ratio and proportion, perimeters, areas, volumes, reading and interpreting graphs, and measures of central tendency.  MTH 052 does not serve as a prerequisite for MTH 65. 4 lecture hrs/wk. W *Additional ProctorU testing fees may apply, contact the instructor for further information

**Registration-Enforced Prerequisite:** MTH 020 with a C or better, placement by approved measure, or instructor permission.

### MTH 060: Intro to Algebra (4)

This course is intended for students who wish to start at the beginning of the study of algebra, including introduction to graphing. The course emphasizes foundational algebraic concepts, definitions, and procedures along with practical applications and problem-solving skills. This course introduces basic operations on polynomial expressions, linear equations in one and two variables, rates of change, graphs of lines, slope, and introduction to inequalities, while continuing to reinforce operations with real numbers, exponents, order of operations, geometry, and unit conversion. Successful completion prepares the student for MTH 65: Elementary Algebra or MTH 98: Math Literacy. *Additional ProctorU testing fees may apply, contact the instructor for further information. Registration Enforced 4 lecture hrs/wk

**Prerequisite:** MTH 020 with a C or better, placement by approved measure, or instructor permission.

**Terms Typically Offered:** Fall, Winter, Spring, Summer

### MTH 065: Elementary Algebra (4)

This course is the second term of foundational algebra skills. It is intended for the student who has familiarity with beginning algebra and geometry concepts, including foundational graphing skills. The course builds upon the foundational algebraic concepts, definitions, and procedures found in prerequisite courses, along with their practical applications and additional problem-solving skills. This course emphasizes systems of linear equations in two variables, linear inequalities, advanced operations on polynomial expressions including factoring, and introduction to quadratic equations, their properties, and graphs. Successful completion prepares the student for MTH 95: Intermediate Algebra. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk

**Registration-Enforced Prerequisite:** MTH 060 with a grade of C or better, placement by approved measure, or instructor permission.

**Terms Typically Offered:** Fall, Winter, Spring, Summer

### MTH 075: Applied Geometry (3)

This course is designed to further the application and understanding of informal geometric concepts for those students wishing to fill in gaps n their mathematical backgrounds and to prepare themselves for higher level math course.  This course emphasizes geometric concepts rather that formal proofs. *Additional ProctorU testing fees may apply, contact the instructor for further information. 3 lecture hrs/wk

**Registration-Enforced Prerequisite:** MTH 052 or MTH 060 with a grade of C or better, placement by approved measure, or instructor permission.

**Terms Typically Offered:** Spring

### MTH 095: Intermediate Algebra (4)

This course is intended for students with prior exposure to algebra topics such as solving linear equations in one and two variables, solving quadratic equations, graphing linear and quadratic equations, operations on polynomials, and factoring. This course provides more in-depth study of these algebraic concepts, definitions, and procedures found in the pre-requisite MTH 60 and MTH 65 courses. This course also introduces the concept of function and function notation, including exploration of quadratic, rational, radical, and exponential functions and their properties, along with more advanced practical applications and problem-solving skills. Successful completion prepares the student for MTH 105Z: Math in Society or MTH 111Z: Precalculus I. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk

**Registration-Enforced Prerequisite:** MTH 065 with a grade of C or better, placement by approved measure, or instructor permission.

**Terms Typically Offered:** Fall, Winter, Spring

**MTH 098: Math Literacy (5)**
MTH 098 provides algebra, quantitative reasoning, and problem-solving skills needed in MTH 105 and in other college courses in programs not requiring calculus or trigonometry. For students who do not need calculus or trigonometry, MTH 098 is an alternative to MTH 065/095 as a pathway to MTH 105. *Additional ProctorU testing fees may apply, contact the instructor for further information. 5 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 060 with a grade of C or better, or placement by approved measure into MTH 065 and higher.
**Terms Typically Offered:** Winter

**MTH 105Z: Math in Society (4)**
An exploration of present-day applications of mathematics focused on developing numeracy. Major topics include quantitative reasoning and problem-solving strategies, probability and statistics, and financial mathematics; these topics are to be weighted approximately equally. This course emphasizes mathematical literacy and communication, relevant everyday applications, and the appropriate use of current technology. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 095 or MTH 098 with a grade of C or better, placement by approved measure, or instructor permission.
**Terms Typically Offered:** Winter, Spring

**MTH 111Z: Precalculus I Functions (4)**
A course primarily designed for students preparing for trigonometry or calculus. This course focuses on functions and their properties, including polynomial, rational, exponential, logarithmic, piecewise-defined, and inverse functions. These topics will be explored symbolically, numerically, and graphically in real-life applications and interpreted in context. This course emphasizes skill building, problem solving, modeling, reasoning, communication, connections with other disciplines, and the appropriate use of present-day technology. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 095 with a grade of C or better, placement by approved measures, or instructor permission.
**Terms Typically Offered:** Summer, Fall, Winter, Spring

**MTH 112Z: Precalculus II Trigonometry (4)**
A course primarily designed for students preparing for calculus and related disciplines. This course explores trigonometric functions and their applications as well as the language and measurement of angles, triangles, circles, and vectors. These topics will be explored symbolically, numerically, and graphically in real-life applications and interpreted in context. This course emphasizes skill building, problem solving, modeling, reasoning, communication, connections with other disciplines, and the appropriate use of present-day technology. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 111Z or equivalent with a grade C or better, or instructor permission.
**Terms Typically Offered:** Summer, Fall, Winter, Spring

**MTH 211: Fundamentals-Elem Math I (4)**
This is the first quarter of a three quarter sequence of mathematics for prospective teachers. This course will provide a background in basic mathematical concepts. As these concepts are studied we will examine alternative approaches to the teaching of mathematics, problem solving, integrating math with other subjects, the history of math, the use of computers in math education, and current trends in math education. The goal of the course is to produce educators who have mastered the basics of math, to produce educators who enjoy math and are able to share this enthusiasm with their students, and to produce educators who are able to teach math using a variety of approaches.*Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 095 with a grade of C or better, placement by approved measure, or instructor permission.
**Terms Typically Offered:** Fall

**MTH 212: Fundamentals-Elem Math II (4)**
This is the second quarter of a three quarter sequence of mathematics for prospective elementary school teachers. The topics covered include a study of the mathematics of fractions and proportions, integers and the real number system. Focus will be on representations and models for numbers and operations on them. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 211 with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Winter

**MTH 213: Fundamentals-Elem Math III (4)**
This is the third quarter of a three quarter sequence of mathematics for prospective elementary school teachers. Topics include statistics, probability, geometry and measurement. Focus will be on representations and models for illustration of topics. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 212 with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Spring

**MTH 231: Elem Discrete Math I (4)**
This is an introductory course in discrete mathematics, designed to introduce basic non-calculus mathematics required in the study of computer science. Topics include elementary logic, set theory, functions, mathematical induction, matrices, and combinatorics. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Instructor-Enforced Prerequisite:** MTH 111Z or equivalent with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Winter

**MTH 241: Calculus f-Mgmt-Soc Sci (4)**
This is the first of two courses in elementary calculus designed especially for business and social science majors. The student will gain an understanding of differential calculus numerically, algebraically, and graphically, and will be able to use it to analyze and solve problems. Throughout the course, applications to business, economics, and social science will be stressed. Computers and graphing calculators will be used to learn and demonstrate the mathematical concepts. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 111Z with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Winter

**MTH 242: Calculus Mgmt-Soc Sci II (4)**
This is the second of two courses in elementary calculus designed especially for business and social science majors. The student will gain an understanding of integer calculus numerically, algebraically, and graphically, and will be able to use it to analyze and solve problems. Throughout the course, applications to business, economics, and social science will be stressed. Computers and graphing calculators will be used to learn and demonstrate the mathematical concepts. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 241 with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Spring

**MTH 251: Calculus I (5)**
This course deals entirely with differential calculus. The course (1) develops the main ideas of calculus forming a sound theoretical basis (proving some of the theorems and deriving the various formulas and methods, (2) presents applications of the calculus, (3) provides the necessary background for MTH 252, and (4) uses technology to teach and demonstrate the mathematical concepts of calculus. *Additional ProctorU testing fees may apply, contact the instructor for further information. 5 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 112Z or with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Fall, Winter

**MTH 252: Calculus II (4)**
This course is a continuation of MTH 251. The course (1) presents a blend of theory and applications of integral calculus and (2) provides the necessary background for MTH 253, and (3) uses computers to learn and demonstrate the mathematical concepts of the calculus. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 251 with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Winter, Spring

**MTH 253: Calculus III (4)**
This is the third quarter of a four-quarter sequence for math majors and engineering students. Topics include improper integrals, conic sections, polar coordinates, parametric equations, and infinite series. Computers and graphing calculators will be used to learn and demonstrate the mathematical concepts. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Instructor-Enforced Prerequisite:** MTH 252 with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Spring

**MTH 254: Vector Calculus I (4)**
Multivariable Calculus covers topics in calculus extended to functions involving several variables. The course is split into two main sections: functions of one independent variable whose range has several components (vector-valued functions) and functions of several independent variables whose range has one component (multivariable functions). The class will discuss basics such as domain, graph and range and calculus topics such as differentiation and integration. Applications to various fields of interest will be emphasized throughout the course. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 252 with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Fall

**MTH 256: Differential Equations (4)**
This course deals with ordinary differential equations (as opposed to partial differential equations.) Various methods are presented for solving first, second, and higher order differential equations. Extensive work is done on applications. We will use the computer to demonstrate and illustrate the mathematical concepts involved. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 252 with a grade of C or better.
**Terms Typically Offered:** Winter

**MTH 261: Intro to Linear Algebra (2)**
This class is designed as a companion course to MTH 253 to satisfy entry requirements into Oregon State University's School of Engineering, but can also be taken as an introduction to Linear Algebra. Linear Algebra deals with the study of linear systems, matrices and linear transformations. Topics include: the systematic solution of linear systems by reduction methods, the algebra of matrices, representation of linear systems using matrices, linear transformations and eigenvalues. Applications to various fields of interest will be emphasized throughout the course. Use of technology and mathematics will be emphasized throughout the course. Use of graphing calculators and/or computer software will be expected of students. *Additional ProctorU testing fees may apply, contact the instructor for further information. 2 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 111Z with a grade of C or better, or instructor permission.
**Terms Typically Offered:** Spring

**MTH 265: Statistics-Scientists-Engineer (4)**
This course covers probability and inferential statistics applied to scientific and engineering problems. Includes random variables, expectation, sampling, estimation, hypothesis testing, regression, correlation and analysis of variance. This course satisfies the OSU requirement of ST 314 for engineering programs. *Additional ProctorU testing fees may apply, contact the instructor for further information. 4 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 252 with a grade of C or better.
**Terms Typically Offered:** Spring

**MTH 280: CWE: Math (1-13)**
Qualified students work at training sites that provide experience appropriate to their major. These experiences will provide the opportunity for students to gain knowledge of various tasks performed in their career field. A student may take any number of CWE credits per term, not to exceed 13 credits per year. 1 credit = 33 hours of lab. F, W, S, Su *Additional ProctorU testing fees may apply, contact the instructor for further information
**Registration-Enforced Prerequisite:** Instructor approval.

**MTH 299: Elem Discrete Math II (4)**
Introductory course in discrete mathematics, designed to introduce basic non-calculus mathematics required in the study of computer science. Topics include elementary logic, set theory, functions, mathematical induction, matrices, and combinatorics. *Additional ProctorU testing fees may apply, contact the instructor for further information 4 lecture hrs/wk
**Terms Typically Offered:** Winter