Mathematics - CPS (MTH)

Courses

MTH 1100. College Algebra. (3 Hours)
Covers laws of exponents, factoring, inequalities, polynomials, roots, linear and quadratic equations, complex numbers, rational functions, systems of equations, exponential and logarithmic functions, and inverse functions. Requires students to communicate mathematical ideas using symbolic and written forms and to apply algebraic concepts to real-life applications. Seeks to provide students with a solid foundation of concepts and skills necessary to advance to statistics or precalculus. Requires prior knowledge of the manipulation and simplification of basic algebraic expressions.

Attribute(s): NUpath Formal/Quant Reasoning

MTH 1105. Quantitative Skills and Reasoning: Practical Math. (3 Hours)
Uses basic mathematics and statistics concepts to analyze, synthesize, and interpret quantitative data in the context of various disciplines and everyday applications. This is an introductory mathematics course.

MTH 1200. Precalculus. (3 Hours)
Combines algebraic, geometric, and trigonometric concepts and techniques to model real-world situations (that is, exponential growth and decay, periodic phenomena). Successful completion of this course should strengthen the student's conceptual understanding of mathematics and critical reasoning. Focuses on linear, polynomial, exponential, logarithmic, trigonometric functions and conic sections. Emphasizes understanding, manipulating, and graphing these basic functions, their inverses and compositions, and using them to solve applications drawn from the physical and natural sciences.

Attribute(s): NUpath Formal/Quant Reasoning

MTH 1990. Elective. (1-4 Hours)
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

MTH 2100. Calculus 1. (3 Hours)
Focuses primarily on differential calculus. Using mathematical models, offers students an opportunity to make predictions and inferences in a variety of applications that relate to the fields of engineering, economics, biology, etc. For example, students can use differential calculus to determine what is the most cost-effective speed to drive a car, using the least amount of fuel. These types of problems, called optimization problems, require an understanding of the derivative as a rate of change. The course focuses on how to apply rules and properties of derivatives to model and solve application problems in science, engineering, and technology. As a prelude to MTH 2105, at the end of the semester, the concept of the integral is introduced as a limit of sums and antidifferentiation.

Attribute(s): NUpath Formal/Quant Reasoning

MTH 2105. Calculus 2. (3 Hours)
Continues MTH 2100. Uses mathematical models to make predictions and inferences in a variety of applications that relate to the fields of engineering, economics, biology, etc. Focuses primarily on integral calculus and infinite sequences and series. Topics include definite and indefinite integration, the fundamental theorem of calculus, and the use of integration methods in the calculation of areas and volumes and other applications. Introduces improper integrals as well as the study of infinite sequences and series, power series, Taylor series, and techniques for determining convergence or divergence of sequences series. This course offers an in-depth overview of the above concepts and applies them to solve problems in science, engineering, and technology.

Prerequisite(s): MTH 2100 with a minimum grade of D-
Attribute(s): NUpath Formal/Quant Reasoning

MTH 2120. Technical Math 1. (3 Hours)
Reviews topics of trigonometry, differential and integral calculus. Emphasis is placed on limits, continuity, derivatives and integrals of algebraic and transcendental functions of one variable. Upon completion, students should be able to select and use appropriate models and techniques for finding solutions to derivative-related problems with and without technology. This is an accelerated course for designed for Advanced Manufacturing Systems and Engineering Technology students.

MTH 2220. Technical Math 2. (3 Hours)
Continuation of MTH 2120. Focuses primarily on integral calculus and differential equations. Topics include definite and indefinite integration, the fundamental theorem of calculus, and the use of integration methods in the calculation of areas and volumes, ordinary differential equations, and Laplace transforms.

Prerequisite(s): MTH 2120 (may be taken concurrently) with a minimum grade of D-

MTH 2300. Business Statistics. (3 Hours)
Offers students an opportunity to obtain the necessary skills to collect, summarize, analyze, and interpret business-related data. Covers descriptive statistics, sampling and sampling distributions, statistical inference, relationships between variables, formulating and testing hypotheses, and regression analysis in the context of business decision making.

Prerequisite(s): MTH 1100 with a minimum grade of D- or MTH 1200 with a minimum grade of D- or MTH 2100 with a minimum grade of D-
Attribute(s): NUpath Analyzing/Using Data

MTH 2310. Statistics for the Behavioral and Social Sciences. (3 Hours)
Offers students an opportunity to obtain the necessary skills to collect, summarize, analyze, and interpret social and behavioral science data. Covers descriptive statistics, sampling and sampling distributions, statistical inference, relationships between variables, formulating and testing hypotheses, and regression analysis in the context of the social and behavioral sciences.

Prerequisite(s): MTH 1100 with a minimum grade of D- or MTH 1200 with a minimum grade of D- or MTH 2100 with a minimum grade of D-
Attribute(s): NUpath Analyzing/Using Data, NUpath Formal/Quant Reasoning

MTH 2400. Technology and Applications of Discrete Mathematics. (3 Hours)
Offers students experience with and exposure to ideas and techniques from discrete mathematics, which is at the foundation of the technological disciplines. Focuses on applications and practical use of discrete mathematics as it is applied to the computing sciences and engineering disciplines. Topics covered include sets; logic; Boolean algebra; machine representations of numbers (decimal, binary, octal, hexadecimal) and arithmetic; counting methods; graphs; and trees. Specific applications include algorithms and complexity, circuits and circuit diagrams, searching and sorting, networks, probability, and finite-state machines. Requires students to select and apply appropriate techniques from discrete math to address common problems found in modern technological systems, especially software and computing hardware design.

Prerequisite(s): MTH 1100 with a minimum grade of D- or MTH 1200 with a minimum grade of D- or MTH 2100 with a minimum grade of D-
Attribute(s): NUpath Formal/Quant Reasoning

MTH 2450. Discrete Structures. (3 Hours)
Covers the necessary foundations from discrete mathematics as widely applied to the computer science and engineering disciplines. Emphasizes appropriate techniques from discrete math to address complex problems found in modern computing science and computer engineering applications.

Prerequisite(s): MTH 1100 with a minimum grade of D- or MTH 1200 with a minimum grade of D- or MTH 2100 with a minimum grade of D-
Attribute(s): NUpath Formal/Quant Reasoning

MTH 2500. Statistical Quality Control. (3 Hours)
Introduces statistical analysis and concepts related to engineering manufacturing quality control, including process capability, control charts, acceptance sampling, and process improvement. Other topics include Six Sigma, statistical and graphical data summaries, quality engineering, and quality design.

Prerequisite(s): MTH 2120 with a minimum grade of D-

MTH 2990. Elective. (1-4 Hours)
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

MTH 3300. Applied Probability and Statistics. (3 Hours)
Covers randomness, finite probability space, probability measure, events; conditional probability, independence, Bayes' theorem; discrete random variables; binomial and Poisson distributions; concepts of mean and variance; continuous random variables; exponential and normal distribution, probability density functions, calculation of mean and variance; central limit theorem and implications for normal distribution; purpose and the nature of sampling; nature of estimates, point estimates, interval estimates; maximum likelihood, least-squares approach; confidence intervals; estimates for one or two samples; development of models and associated hypotheses; nature of hypothesis formulation, null and alternate hypotheses, testing hypotheses; test statistics: t-test, chi-squared test; correlation and regression; Markov processes, discrete time systems, and continuous time systems; queuing theory, including system simulation and modeling, queuing methods.

Prerequisite(s): MTH 2100 with a minimum grade of D- or MTH 2105 with a minimum grade of D- or MTH 2110 with a minimum grade of D-
Attribute(s): NUpath Analyzing/Using Data

MTH 3990. Elective. (1-4 Hours)
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

MTH 4955. Project. (1-4 Hours)
Focuses on in-depth project in which a student conducts research or produces a product related to the student's major field. May be repeated without limit.

MTH 4990. Elective. (1-4 Hours)
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

MTH 6962. Elective. (1-4 Hours)
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

MTH 7962. Elective. (1-4 Hours)
Offers elective credit for courses taken at other academic institutions.