ARRUPE MATHEMATICS (ACMAT)

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ACMAT 100 Fundamentals of Math (3 Credit Hours)
This course focuses on the foundations of algebra. Topics include the real number system operations, variable expressions, linear equations and inequalities, graphing linear equations in two variables, slope and equations of a line, exponents and polynomials, applications of proportion, percent and the use of formulas to develop problem solving skills.
Course equivalencies: ACMAT100/MATH100
Outcomes:
Students will evaluate variable expressions; Students will solve and graph linear equations in two variables; Students will apply ratios and proportions

ACMAT 117 Precalculus I (3 Credit Hours)
Pre-requisites: "C-" or better in ACMAT 100 or by test placement
This course covers algebraic topics ranging from functions and their applications to complex numbers to inverse functions to the fundamental theorem of algebra.
Course equivalencies: ACMAT 117/MATH 117
Outcomes:
Students who plan to study calculus will obtain the algebraic background needed to enroll in precalculus

ACMAT 118 Precalculus II (3 Credit Hours)
Pre-requisites: "C-" or better in ACMAT 117 or required score on placement test
This course is a continuation of MATH 117 focusing on exponential, logarithmic, trigonometric, and inverse trigonometric functions, their graphs, and their properties. Techniques for solving equalities involving these functions are examined. Trigonometric identities, sum and difference formulas, double and half-angle formulas, the Laws of Sines and Cosines, and polar coordinates are also considered.
Course equivalencies: MATH 118/ ACMAT 118
Outcomes:
Students will build and improve their skills in algebra and pre-calculus topics in order to be able solve a variety of problems; The content and the strategies students will learn will prepare them to be successful in Calculus and courses beyond; Students will frequently be asked to express their mathematical thinking orally and in writing by working in groups and explaining their work

ACMAT 161 Calculus I (4 Credit Hours)
A traditional introduction to differential and integral calculus. Functions, limits, differentiation, the Intermediate Value Theorem, curve sketching, optimization problem, related rates, definite and indefinite integrals, the Fundamental Theorem of Calculus, logarithm and exponential functions, applications to the natural and social sciences. Restricted to Arrupe students. Students are eligible to enroll in the course upon successful completion of ACMAT 118 or by math placement exam.
Course equivalencies: ACMAT 161/MATH 161
Outcomes:
Students will obtain the background needed to enroll in Calculus II; This course satisfies the quantitative literacy requirement of the core curriculum

ACMAT 162 Calculus II (4 Credit Hours)
This course is a continuation of ACMAT 161, Calculus I.
Course equivalencies: ACMAT 162/MATH 162
Outcomes:
1) Select and apply appropriate models and integration techniques to solve problems involving algebraic and transcendental functions; these problems will include but are not limited to applications involving volume, arc length, surface area, force and work; 2) Recognize and implement appropriate techniques to integrate trigonometric functions and apply trigonometric substitutions to solve integrals; 3) Decompose a rational integrand using partial fractions; 4) Evaluate proper and improper integrals using various integration techniques: 5) Determine convergence of improper integrals with discontinuities in their domain or infinite limits of integration; 6) Apply basic anti-differentiation techniques to selected problems arising in various fields such as physical modeling, economics and population dynamics; 7) Find general solutions to basic differential equations and analytical solutions to separable differential equations; 8) Find solutions of various kinds of differential equations using Direction Fields and Euler's Method; 9) Develop the algebra associated with vectors in both two and three dimensions and define two fundamental operations for vectors: the dot product and the cross product; 10) Develop equations for lines and planes in space and explore their properties and uses; 11) Apply familiar single-variable function properties (domain, graphs, limits, continuity and derivatives) to multivariable functions; 12) Find maximum and minimum values of multivariable functions using partial derivatives; 13) Identify the Directional Derivatives and the gradient of a multivariable function