Mathematics (MTH)

The Mathematics program at Pikeville College is part of the Division of Mathematics and Natural Sciences. This program is designed to promote critical thinking and analytical reasoning and to prepare students for mathematical careers in business, government, teaching, and industry.

Mathematics Major

Basic program for a baccalaureate degree

I. Core Requirements ..... 52-56 hours

II. Mathematics Requirements ..... 33 hours

MTH 121	Calculus I	4
MTH 222	Calculus II	4
MTH 223	Calculus III	4
MTH 303	Introduction to Abstract Mathematics	3
MTH 322	Differential Equations	3
MTH 335	Linear Algebra	3
MTH	Math electives at 300-400 level	9
CS	One computer language course	3

III. Related Studies Requirements ..... 8 hours
PHY 223/224 or CS 221/222

IV. General electives as needed to meet the minimum requirements of 128 semester hours.

Mathematics Minor

I. Mathematics Requirements ..... 21 hours
Must include MTH 121, 222, 223, 335 and MTH electives at the 200 level or higher.

II. Related Studies Requirements ..... 4 hours
PHY 223 or CS 221.

Teaching Certification In Mathematics

(See Education)

Mathematics Course Descriptions

MTH 098 Fundamentals of Mathematics .....(3)
(See Developmental Studies)

MTH 099 Beginning Algebra.....(3)
(See Developmental Studies)

MTH 111 Algebra for College Students.....(3)
A study of algebraic concepts and operations including products and factors of polynomials, equivalent fractions, powers and roots, linear and quadratic equations, graphs of functions and equations, solution of systems of equations, and practical applications. Skills in problem solving are developed. *Prerequisite: MTH 099 or placement by examination.*

MTH 113 Precalculus Algebra .....(3)
Further study of topics in algebra including linear and quadratic equations, functions, relations, and their graphs, polynomials and rational functions, exponential and logarithmic functions, systems of linear equations, and applications. *Prerequisite: MTH 111 or placement by examination.*

MTH 114 Trigonometry.....(2)
A study of concepts and applications of circular and trigonometric functions. Includes graphs of trigonometric functions, inverse trigonometric functions, circular motion, solution of triangles, and trigonometric identities. *Should be taken concurrently with MTH 113.*

MTH 115 Fundamentals of Geometry.....(3)
A study of plane and solid geometry, including properties of triangles, quadrilaterals, regular polygons, and circles, and congruence, similarity, area, volume, and transformations and symmetry. *Prerequisite: MTH 111 or higher.*

MTH 121 Calculus I.....(4)
A study of functions, limits and continuity, derivatives, and an introduction to integrals. Applications to finding tangent lines, solving maximum and minimum problems, solving related rate problems, and finding areas. *Prerequisites: MTH 113 and 114 or placement by examination.*

MTH 200 Elementary Probability and Statistics.....(3)
A study of the basic concepts of probability and statistics including permutations, combinations, binomial distributions and standard deviations, with emphasis on interpretations and hypothesis testing. *Prerequisite: MTH 111 or higher. Cannot be used for the Mathematics Minor.*

MTH 222 Calculus II.....(4)
A study of exponential and logarithmic functions, applications of the integral to finding volumes, arc lengths, surface areas, and centroids, techniques of integration, polar coordinates, and indeterminate forms. *Prerequisite: MTH 121.*

MTH 223 Calculus III .....(4)
A study of infinite series, parametric equations, vectors in the plane, curves and surfaces in space, partial derivatives, and multiple integrals. *Prerequisite: MTH 222.*

MTH 251 Discrete Mathematics.....(3)
A study of the elements of sets, set operations, mathematical induction, basic counting techniques, and recurrence relations. *Prerequisite: MTH 113 or higher.*

MTH 290 Special Topics ..... (1-4)
A study of a selected topic of special interest. The topic may differ each time the course is offered and may be proposed by either the instructor or by the student. May be taken for credit any number of times, provided a different topic is offered each time. *Prerequisite: Consent of Instructor.*

MTH 299 Directed Study ..... (1-3)
Individual basic study of a selected topic in mathematics, under the direction of a member of the faculty. Normally open only to students who have completed all

regularly offered courses in the mathematics major. *Prerequisites: Consent of the Instructor, Division Chair, and Dean of the College.*

MTH 303 Introduction to Abstract Mathematics .....**(3)**
An introduction to abstract mathematics and proofs by means of a study of selected topics in elementary number theory. *Prerequisite: MTH 222 or a prerequisite of MTH 251 and a corequisite of MTH 222.*

MTH 305 History of Mathematics.....**(3)**
A chronological presentation of the development of the science of mathematics, with emphasis placed on the significant problems, inconsistencies, and discoveries that led to the growth of the field of mathematics. *Prerequisite: MTH 223.*

MTH 307 Complex Variables .....**(3)**
Functions, limits, continuity, differentiation, and integration of functions of a complex variable are examined. Also, contour integration and applications to physics and mechanics are presented. *Prerequisite: MTH 223.*

MTH 320 Introduction to Numerical Methods .....**(3)**
Algorithms for the solution of numerical problems implemented on micro-computers; includes discussion of error, polynomial interpolation, solution of nonlinear equations, and numerical integration. *Prerequisites: MTH 222 and either CS 112 or 221. Cross-listed as CS 320.*

MTH 322 Differential Equations .....**(3)**
A study of simple types of ordinary differential equations of the first order and higher orders, series solutions, LaPlace transforms, and applications. *Prerequisite: MTH 223.*

MTH 335 Linear Algebra .....**(3)**
A study of vector spaces, linear equations, linear transformations, matrices, determinants, and geometric applications of these concepts. *Prerequisite: MTH 222.*

MTH 400 Advanced Geometry .....**(3)**
A study of advanced topics in plane and solid geometry. Topics may include, but are not limited to, methods of proof, constructions, loci, elementary transformations, introduction to non-Euclidean geometry, and introduction to projective geometry. *Prerequisite: MTH 303.*

MTH 410 Abstract Algebra .....**(3)**
A study of abstract binary operations, groups, rings, and fields. *Prerequisite: MTH 303 or consent of the Instructor.*

MTH 490 Special Topics ..... **(1-4)**
A study of a selected topic of special interest. The topic may differ each time the course is offered and may be proposed by either the Instructor or by students. *Prerequisite: MTH 223 or consent of the Instructor. May be taken for credit any number of times, provided that a different topic is studied each time.*

MTH 495 Seminar in Mathematics.....**(3)**
Study of a variety of mathematical topics of interest to instructor and students, with active student participation emphasized. *Prerequisites: Senior standing, Mathematics major, and consent of the Instructor.*

MTH 499 Directed Study ..... (1-3)
Individual advanced study of a selected topic in mathematics, under the direction of a member of the faculty. Normally open only to students who have completed all regularly offered courses in the mathematics major. *Prerequisites: Consent of the Instructor, Division Chair, and Dean of the College.*