MATHEMATICS MAJOR

Department Advanced Placement Policy

AP Calculus

Students who have received a score of 4 or 5 on the AP Calculus AB exam, or a subscore of 4 or 5 on the AP Calculus BC Exam, will earn credit for MATH 135 Calculus 1 and are advised to take MATH 136 Calculus 2. Students will forfeit their credit if they opt to take MATH 133 Calculus 1 with Fundamentals or MATH 135 Calculus 1. Students who receive a score of 4 or 5 on the AP Calculus BC exam will earn credit for MATH 136 Calculus 2 and are advised to take MATH 241 Multivariable Calculus. Students will forfeit their credit if they opt to take MATH 133 Calculus 1 with Fundamentals, MATH 135 Calculus 1 or MATH 136 Calculus 2.

AP Computer Science

Students with a score of 4 or 5 on the AP Computer Science A exam earn one unit of credit for CSCI 131 Techniques of Programming and are encouraged to consider enrolling in CSCI 132 Data Structures. Students who experienced significant disruptions to their AP courses in Spring 2020, and any students who are not confident of their programming skills, are encouraged to contact Prof. Kevin Walsh (kwalsh@holycross.edu) for advice on selecting an appropriate course. Students with AP Computer Science A credit will forfeit their AP credit if they opt to take either CSCI 131 or CSCI 110. AP Computer Science A credit counts towards fulfilling computer science major and minor requirements. A score of 4 or 5 on the AP Computer Science Principles exam will earn one unit of credit for CSCI 110. This course does not count toward fulfilling the computer science major or minor requirements. Regardless of score, all students who have taken AP Computer Science Principles are encouraged to take CSCI 131 Techniques of Programming. Students will forfeit their AP credit if they opt to take CSCI 110. A score of 4 or 5 on either AP Computer Science exam fulfills the mathematical science common area requirement.

Requirements

Majors must take at least 11 courses offered by the mathematics and computer science department. The following courses are required:

Code	Title
Required Courses:	
MATH 135	Calculus 1
or MATH 133	Calculus 1 with Fundamentals
MATH 136	Calculus 2
MATH 241	Multivariable Calculus
MATH 243	Mathematical Structures
MATH 244	Linear Algebra
MATH 351	Modern Algebra 1
MATH 361	Real Analysis 1
Three electives at the 300 level or above. One must be a project course.	
MATH 301	Topics In Geometry
MATH 302	Differential Geometry
MATH 303	Mathematical Models
MATH 304	Ordinary Differential Equations
MATH 305	Complex Analysis
MATH 352	Modern Algebra 2
MATH 353	Number Theory
MATH 357	Combinatorics
MATH 362	Real Analysis 2
MATH 363	Topics In Topology
MATH 371	Methods of Numerical Analysis
MATH 373	Partial Differential Equations
MATH 374	Dynamical Systems
MATH 392	Seminar
MATH 400	Directed Reading
MATH 410	Directed Project
MATH 495	Mathematics Honors Thesis
MATH 496	Mathematics Honors Thesis
STAT 375	Probability Theory
STAT 376	Mathematical Statistics
STAT 380	Statistical Computing
The remaining elective course may be either an additional 200 or 300 level mathematics course or one of the following: [1]	
CSCI 131	Techniques of Programming
CSCI 132	Data Structures
STAT 220	Statistics
ECON 249	Statistics

[1]   A maximum of 2 AP credits may be applied toward the major.

MATH 110 Topics In Mathematics, STAT 120 Statistical Reasoning, and STAT 130 Introduction to Data Science do not count toward the mathematics major.

Project Courses

Depending on the preference of the instructor or the semester offered, some of the 300-level electives (e.g. MATH 303 or MATH 357) are designated as project courses. In these courses, in place of a final exam, students work on a substantial project leading to a written report and an oral presentation. These projects provide majors with independent learning experiences, where students either investigate some topic using the tools and concepts studied in the course or explore mathematical topics beyond those covered in the course.

Additional Opportunities for Exploration:

Majors are encouraged to take advantage of the close student-faculty contact afforded by upper-division seminars, independent study, and departmental honors, which permit students to explore topics of mutual interest to students and faculty that are not part of the regular course offerings. Also, throughout the curriculum, in courses and in independent work, students are able to explore and utilize the growing relationship between mathematics and computing.