

MATHEMATICS



AT HAMPSHIRE COLLEGE

Mathematics is regarded as a way of thinking, not simply a collection of results. An exploratory approach is used. Collaboration is encouraged. Students are encouraged and empowered to use the language and concepts of mathematics in their other work. Most of Hampshire's math students find the subject an essential component of their work in other disciplines, but there are some who pursue math for its own sake. Off-campus courses, individual work with Hampshire faculty, the Division II committee experience, the opportunity to teach, and the Division III independent project contribute to Hampshire having more mathematics graduates who pursue advanced degrees than most colleges of comparable size.

Office of Admissions

Hampshire College

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Sample First-Year Course

Puzzles and Paradoxes

It has been argued that puzzling is as intrinsic to human nature as humor, language, music, and mathematics. Zeno's paradoxes of motion and the liar and heap paradoxes ("This sentence is false," "Does one grain of sand change a non-heap into a heap?") have challenged thinkers for centuries, and other paradoxes have forced changes in philosophy, scientific thinking, logic, and mathematics. Recreational mathematics will pervade the course, and we'll grapple with irrationality, pigeonholes, infinity, and the fourth dimension. We'll discover, create, classify, share, enjoy, and be frustrated and amazed by lots of visual illusions, as well as mechanical, take-apart, assembly, sequential, jigsaw, word, and logic puzzles. We'll hone our problem-solving skills and consider the pedagogic and social value of puzzles. Armed with examples and experience, we might find some possible answers to "What makes a puzzle 'good?'" and "Why do people puzzle?"

Student Project Titles

Computational Complexity and Primality Testing

Connectedness of Randomly Generated Graphs

Engineering in a Small World

Mathematical Modeling of Infectious Disease Epidemics

Mathematics and Western Literature

Non Euclidean Geometry, Reality, and High School Mathematics

Math Literacy in American Schools and Society: the Accessibility and Promotion of Math Education

The Pedagogy of Math Games

Sample Courses

At Hampshire

Animals, Robots & Applied Design
Calculus in Context
Complex Function Theory
Computer Animation III
Computer Music I
Data Structures
Economic Development
Genetic Programming
Linear Algebra
Programming Artificial Life
Puzzles & Paradoxes
Structure of Randomness
What Computers Can't Do
Statistics

Through the Consortium

Algorithms (AC)
Circuit Theory (SC)
Combinatorics (UM)
Complex Variables (UM)
Differential Equations (MHC)
Discrete Mathematics (AC)
Electromagnetic Theory (MHC)
Explorations in Cryptology (MHC)
Game Theory & Application (AC)
Mathematical Statistics (MHC)
Valid & Invalid Reasoning (SC)

(continued on reverse)

Faculty Profiles

Kenneth R. Hoffman, professor of mathematics

Kenneth Hoffman holds an M.A. from Harvard, where he also served as a teaching fellow. He taught mathematics at Talladega College during 1965–70. In addition to population biology and mathematical modeling, Hoffman's interests include education, American Indians, and natural history.

David C. Kelly, associate professor of mathematics

David Kelly has taught at New College, Oberlin College, and Talladega College. He holds an A.B. from Princeton University, an S.M. from the Massachusetts Institute of Technology, and an A.M. from Dartmouth College. He has, since 1971, directed the well-respected Hampshire College Summer Studies in Mathematics Program for high ability high school students. His interests include analysis, probability, the history of mathematics, and recreational mathematics.

Facilities and Resources

Computer classrooms, labs, and site licenses for Mathematica, True BASIC, and other mathematical and statistical software support the study and use of mathematics at Hampshire.

Quantitative reasoning is considered an important component of every student's education, and for that reason, the Quantitative Resource Center on campus provides peer tutoring and assistance to students who need to use statistics or other forms of mathematical analysis. The center also encourages faculty across the disciplines to incorporate quantitative reasoning in their teaching.

Students at Hampshire have access to the large and active Five College mathematical community, to computer scientists, economists, and other practitioners of the mathematical arts.

One of the more radical and successful of the calculus reform efforts was developed at Hampshire with Five College collaboration. *Calculus in Context* is a course and text based, in part, on the realization that the computer has radically enlarged the set of accessible real-world problems and reduced the importance of formulaic manipulation. The course begins with the consideration of a model for the spread of an epidemic and applies the calculus to dynamical systems in ecology and economics as well as in physics and chemistry.

The Hampshire College Summer Studies in Mathematics Program (www.hcssim.org) is a widely respected intensive program that brings high ability high school students to Hampshire for six weeks to do, share, and enjoy mathematics. College students serve as assistants, participating in seven hours of workshops and problem sessions each day, living in the program dorm, and joining students for meals and recreational activities.

