Ph.D. Program in Mathematics

■ Program Overview

Ph.D in Mathematics is provided by the Department of Mathematics and the Department of Applied and Computational Mathematics under the School of Mathematical Sciences. Candidates with a master's degree are expected to graduate in three years and candidates with a bachelor's degree in five years. The objective of this program is to extend the frontiers of research in various fields of mathematics, including but not limited to Algebra, Combinatorics and Graph Theory, Financial Mathematics, Mathematical Physics, Operational Research and Cybernetics, Ordinary Differential Equations and Dynamical Systems, Partial Differential Equation, Probability and Mathematical Statistics and Scientific and Engineering Computing.

■ Main Courses

For candidates holding a master's degree

Course	Requirement
Computing Methods for Optimization and Automatic Control	Optional
Stochastic Analysis	Optional
Algebra and Related Topics(1)	Optional
Algebra and Related Topics(2)	Optional
Number Theory and Related Topics	Optional
Finite Field, Elliptic Curve and Modular Form	Optional
Modern Theory on Partial Differential Equations	Optional
Selected Topics on Partial Differential Equations	Optional
Selected Topics on Mathematical Physics	Optional
Selected Topics on Ordinary Differential Equations	Optional
Selected Topics on Dynamical Systems	Optional
Bifurcation Theory of Ordinary Differential Equations	Optional
Combinatorics, Graph theory and Coding	Optional
Complex Network and Related Topics	Optional
Mathematical Modeling and Scientific Computing	Optional
Numerical Methods for Solving the Mathematical Physics Problems	Optional
Theory of Stochastic Processes	Optional
Financial Mathematics	Optional
Selected Topics in Modern Mathematics (1)	Optional
Selected Topics in Modern Mathematics (2)	Optional
Seminar	Compulsory

For candidates holding a bachelor's degree

Course	Requirement
Fundamental Theory of Algebra	Optional
Analysis	Optional
Differential Manifold and Differential Geometry	Optional
Scientific Computing	Optional
Stochastic Process	Optional
Measure and Probability Theories	Optional
Numerical Method of Differential Equations	Optional
Algebraic Combinatorics	Optional
Number Theory	Optional
Ordinary Differential Equations and Dynamical Systems	Optional
Partial Differential Equations	Optional
Lie Group and Lie Algebra	Optional
Optimization Method	Optional
Method for Applied Mathematics	Optional
Complex Network	Optional
Commutative Algebra and Homological Algebra	Optional
Algebraic Topology	Optional
Graph Theory	Optional
Data Analysis	Optional
Complex Analysis	Optional
Advanced Computing Methods	Optional
Soliton	Optional
Combinational Algorithm	Optional
Algebraic Curve	Optional
Fundamentals of Harmonic Analysis	Optional
Integrability and Bifurcations of Dynamical systems	Optional
Nonlinear Partial Differential Equations	Optional
Computing Method for Optimization and Automatic Control	Optional
Stochastic Analysis	Optional
Algebra and Related Topics(1)	Optional
Algebra and Related Topics(2)	Optional
Number Theory and Related Topics	Optional
Finite Field, Elliptic Curve and Modular Form	Optional
Modern Theory on Partial Differential Equations	Optional
Selected Topics on Partial Differential Equations	Optional
Selected Topics on Mathematical Physics	Optional
Selected Topics on Ordinary Differential Equations	Optional
Selected Topics on Dynamical Systems	Optional
Bifurcation Theory of Ordinary Differential Equations	Optional
Combinatorics, Graph theory and Coding	Optional
Complex Network and Related Topics	Optional
Mathematical Modeling and Scientific Computing	Optional

Numerical Methods for Solving the Mathematical Physics Problems	Optional
Theory of Stochastic Processes	Optional
Financial Mathematics	Optional
Selected Topics in Modern Mathematics (1)	Optional
Selected Topics in Modern Mathematics (2)	Optional
Seminar	Compulsory