

Mathematics

School

S (<https://www.stmarytx.edu/grad/>)chool of Science, Engineering and Technology (<https://www.stmarytx.edu/academics/set/>)

School Interim Dean

Thomas "Ted" Macrini, Ph.D. (tmacrini@stmarytx.edu)

Department

Mathematics (<https://www.stmarytx.edu/academics/department/mathematics/>)

Mathematics is more than just the theory of numbers. It discovers tools from which a quantitative understanding of our world is made possible. Moreover, the language of mathematics is truly a universal language, transcending ethnic, societal and national boundaries. The study of mathematics hones essential logical reasoning skills and teaches techniques that can open doors to exciting and high-paying quantitative careers in business, government, teaching and research.

Department Mission Statement:

The Department of Mathematics provides an integral, quality mathematics education for all students at the University, delivered in the family spirit and focused on the specific needs of their disciplines. We form our majors for vocations in research, industry, and education through active learning that promotes communication, collaboration, and independent exploration and growth.

Program Director

Jason Shaw, Ph.D. (jshaw10@stmarytx.edu)

Dual Credit Teaching in Mathematics

The Mathematics Department at St. Mary's University has long recognized the need to offer a graduate certificate in mathematics for high school teachers, providing 18 graduate hours in mathematics which would enable them to teach dual-credit courses or transition to community college teaching. The Mathematics Department offers six graduate-level mathematics courses to fill this need.

Admissions Requirements

1. Calculus I & II (or equivalent), grade of C or better
2. An undergraduate course in linear algebra*
3. An undergraduate course in multivariate calculus*
4. Minimum GPA of 2.75.

* If no official undergraduate course in these topics has been taken, but a student has other coursework in related areas, students may be considered for admission on a case-by-case basis.

Programs in Mathematics

- Graduate Certificate in Dual Credit Teaching in Mathematics (<https://catalog.stmarytx.edu/graduate/science-engineering-technology/mathematics/certificate-dual-credit-mt/>)

MT 5312. Boundary Value Problems. 3 Semester Hours.

Theory and methods used to analyze linear and nonlinear boundary value problems within both classical and modern frameworks. Emphasis is placed on functional analytic techniques, including Sobolev spaces and weak formulations, to establish existence, uniqueness, and regularity results. Advanced topics such as Sturm–Liouville theory, Green's functions, variational methods, spectral theory, and the treatment of singular and nonlinear problems will be examined. FA2, 8-wk, Asynchronous.

MT 5323. Computing for Mathematics. 3 Semester Hours.

This course introduces graduate students to essential computational tools and methodologies—including LaTeX typesetting, programming in Python and R, numerical analysis, data visualization, simulation techniques, and algorithmic thinking—that serve as the foundation for advanced studies in applied mathematics, mathematical modeling, probability, statistics, image processing, and cryptography. SU, 8-wk, Asynchronous.

MT 5324. Introduction to Applied Mathematics. 3 Semester Hours.

This course provides a comprehensive overview of key problem-solving techniques and foundational concepts in linear algebra, differential equations, and analysis, laying the groundwork for advanced study in mathematical modeling and applied research. SU, 8-wk, Asynchronous.

MT 5331. Advanced Probability. 3 Semester Hours.

Convergence concepts, discrete and continuous probability spaces, random variables and their distributions, independence, conditional expectation, laws of large numbers, central limit theorem, generating functions, and applications. SP1, 8-wk, Asynchronous.

MT 5372. Math Modeling. 3 Semester Hours.

Creative model construction and the modeling process, model fitting and models requiring optimization, empirical model construction, modeling dynamic behavior. FA1, 8-wk, Asynchronous.

MT 5334. Mathematical Statistics. 3 Semester Hours.

This course develops the mathematical foundations of statistics. Topics covered include sampling distributions; estimation methods, including matching moments, percentile matching, and maximum likelihood estimation; properties of estimators, including bias, variance, mean square error, consistency, efficiency, and UMVUE; statistical inference methods, including the construction of confidence intervals for unknown parameters; and hypothesis testing, including the Neyman-Pearson lemma, significance and power, the likelihood ratio test, and information criteria. SP2, 8-wk, Asynchronous.