List of courses that fulfill the BME Math Requirement. Students can choose to take one of the following courses and pass with a B or higher.

ENG EC 505 Stochastic Processes Prereq:(ENGEC401 & CASMA142) or equivalent and either ENGEC381 or ENGEK500. Introduction to discrete and continuous-time random processes. Correlation and power spectral density functions. Linear systems driven by random processes. Optimum detection and estimation. Bayesian, Weiner, and Kalman filtering. 4 cr. either sem.

ENG EK 501 Mathematical Methods I: Linear Algebra and Complex Analysis Introduction to basic applied mathematics for science and engineering, emphasizing practical methods and unifying geometrical concepts. Topics include linear algebra for real and complex matrices. Quadratic forms, Lagrange multipliers and elementary properties of the rotation group. Vector differential and integral calculus. Complex function theory, singularities and multi-valued functions, contour integration and series expansions. Fourier and Laplace transforms. Elementary methods for solving ordinary linear differential and systems of differential equations with applications to electrical circuits and mechanical structures. 4 cr. either sem.

CAS MA 561 Methods of Applied Mathematics I Prereq:(CASMA226 OR CASMA231) Grad Prereq:(CASMA226 OR CASMA231) *Derivation and analysis of the classical equations of mathematical physics; heat equation, wave equation, and potential equation. Initial boundary value problems, method of separation of variables, eigenvalue problems, eigenfunction expansions. Fourier analysis. Existence and uniqueness of solution. 4 cr. 1st sem.

CAS MA 565 Mathematical Models in the Life Sciences Prereq:(CASMA226 OR CASMA231) Grad Prereq:(CASMA226 OR CASMA231) *An introduction to mathematical modeling, using applications in the biological sciences. Mathematics includes linear difference and differential equations, and an introduction to nonlinear phenomena and qualitative methods. An elementary knowledge of differential equations and linear algebra is assumed. 4 cr. either sem.

CAS MA 579 Numerical Methods for Biological Sciences Prereq:(CASMA226 OR CASMA231) or equivalent, and elementary knowledge of linear algebra. Introduction to the use of numerical methods for studying mathematical models of biological systems. Emphasis on the development of these methods; understanding their accuracy, performance, and stability; and their application to the study of biological systems. 4 cr. On Demand

CAS PY 501 Mathematical Physics Introduction to complex variables and residue calculus, asymptotic methods, and conformal mapping; integral transforms; ordinary and partial differential equations; non-linear equations; integral equations.

ENG ME 566 Advanced Engineering Mathematics Prereq (CAS MA 225 OR CAS MA 226); Senior Standing and consent of instructor. Introduces students of engineering to various mathematical techniques which are necessary in order to solve practical problems. Topics covered include a review of calculus methods, elements of probability and statistics, linear algebra, transform methods, difference and differential equations, numerical techniques, and mathematical techniques in optimization theory. Examples and case studies focus on applications to several engineering disciplines. The intended audience for this course is advanced seniors and entering MS engineering students who desire strengthening of their fundamental mathematical skills in preparation for advanced studies and research. (Formerly ENG MN 566)

GRS MA 681 Accelerated Introduction to Statistical Methods for Quantitative Research Prereq:(CASMA225 & CASMA242) or their equivalents. Introduction to statistical methods relevant to research in the computational sciences. Core topics include probability theory, estimation theory, hypothesis testing, linear models, GLMs, and experimental design. Emphasis on developing a firm conceptual understanding of the statistical paradigm through data analyses. 4 cr. On Demand.

Students may petition for a different graduate- level course to count towards the math requirement, subject to approval by the BME Graduate Committee.