

## *Math*

- Students completing the math major will be able to: p apply the procedures of calculus, including differentiation of algebraic, trigonometric, logarithmic, and exponential functions, to solve optimization;
- solve problems that call for an understanding of several fundamental kinds of limits: the limit of a function, the limit of a sequence, the limit of an infinite series, the limiting value of a sum of products that leads to an integral
- use techniques of integration, both exact and approximate, to solve problems in econometrics, elementary physics, and geometry (e.g., area in Cartesian and polar form, arc length in Cartesian and parametric form)
- apply multivariate analysis to three-dimensional objects;
- perform operations, including inversion, on matrices and to use matrices in the solution of systems of equations;
- to apply the abstract ideas of general vector spaces to a wide variety of concrete examples: matrices, Euclidean  $n$ -dimensional spaces, spaces of various kinds of functions studied in calculus classes (e.g., continuous, real-valued, differentiable);
- distinguish various kinds of number systems—rational, real, etc.—and explain their defining and deduced properties;
- solve problems in one or more elective areas, such as differential equations or uncertainty;
- display a rational, logical approach to thinking and, specifically, to explain detailed computations and write logical, cogent, complete, and mathematically correct proofs of both standard theorems and novel problems;
- assess the validity of an argument, to think dispassionately, to evaluate likelihood, to reach conclusions, and to make decisions based on logic and proof, accepting counterintuitive results pursuant to demonstration.