Suggested Quantitative Preparation

Applicable to applicants interested in Accounting, Business and Public Policy, Marketing Science, Real Estate, or Finance.

Please note that not having covered all of these subject areas does not disqualify you from applying.

Applicants to the Berkeley-Haas PhD Program are encouraged to have knowledge of multivariate calculus, basic matrix algebra, and differential equations; completion of a two-year math sequence, which emphasizes proofs and derivations. Some knowledge of statistics and elementary probability can also be beneficial, as is additional coursework in algebra and real analysis. Math titles vary at universities but below are descriptions of courses at UC Berkeley which cover these subjects:

- **Math 1A:** An introduction to differential and integral calculus of functions of one variable, with applications and an introduction to transcendental functions.

- **Math 1B:** Techniques of integration; applications of integration. Infinite sequence and series. First-order ordinary differential equations. Second-order ordinary differential equations; oscillation and damping; series solutions of ordinary differential equations.

- **Math 53:** Parametric equations and polar coordinates. Vectors in 2- and 3-dimensional Euclidean spaces. Partial derivatives. Multiple integrals. Vector calculus. Theorems of Green, Gauss, and Stokes.

- **Math 54:** Basic linear algebra; matrix arithmetic and determinants. Vector spaces; inner product spaces. Eigenvalues and eigenvectors; linear transformations. Homogeneous ordinary differential equations; first-order differential equations with constant coefficients. Fourier series and partial differential equations.

Additional knowledge of the content below can be beneficial to you as a Berkeley-Haas PhD student:

- **Math 104:** The real number system. Sequences, limits, and continuous functions in R and R. The concept of a metric space. Uniform convergence, interchange of limit operations. Infinite series. Mean value theorem and applications. The Riemann integral.

- **Math 110:** Matrices, vector spaces, linear transformations, inner products, determinants. Eigenvectors. QR factorization. Quadratic forms and Rayleigh's principle. Jordan canonical form, applications. Linear functional.

Textbook:
Angel de la Fuente, *Mathematical Methods and Models for Economists,* Cambridge University Press