Modern mathematics, Anglo-American philosophy, linguistics, and the theory of computation all share a single heritage. The lineage of each discipline can be straightforwardly drawn back to the independent inventions by Gottlob Frege (in *Begriffschrift*, 1879) and Charles Sanders Peirce (in *On the Algebra of Logic*, 1885) of the techniques of first-order predicate logic. Both were concerned with the same foundational questions in mathematics and semantics: How are words formed into meaningful sentences? How can we know the propositions of the arithmetic of the natural numbers? What is the epistemological and metaphysical character of formal logic and linguistic meaning?

The discipline of modern linguistics, and especially semantics, draws its terminology and techniques largely from the Peircian model, as does modern mathematics. Philosophy, computing, and the theories of formal languages have primarily been inspired by the *Begriffschrift*. Nonetheless, the common interest in formal logic and the fundamental theorems of mathematics remains in each of these disparate fields.

In the 20th century, as each field made its own, independent developments—the newlyformed conception of synchronic linguistics by Ferdinand de Saussure, the discovery of the Dedekind-Peano axioms and of abstract algebra in mathematics, the dissolution of the logical positivist approach in philosophy, and the invention of the first universal computer—they diverged in their approaches to these fundamental questions, and in fact encountered new ones: How can the grammar of natural language be modelled formally? Can human beings be imitated—or, indeed, surpassed—by general-purpose computing machines? How do the grammar and meaning of natural languages interface?

The course of study in this proposed major considers each of these questions in the context of one of its own: what is the relationship between *formal* models of language—that is, formal logic, axiomatic systems, and Turing machines—and *natural* languages, a category as disparate as English, Tigrinya, and Nicaraguan Sign Language. Of particular interest to this question is the work of Richard Montague, a late-20th century logician, linguist, and philosopher who pioneered the formal system called the „Montague grammar."

A strong background in linguistics, provided by coursework in syntax, semantics, and phonology, gives context to the methods and questions of the study of natural language. The study of higher mathematics in graph theory and abstract algebra allows an understanding of some of the systems that have been used to consider these questions in the past, and of those that underpin the theoretical approach of the study of formal languages. Coursework in computer science, and especially in the theory of computation and computational linguistics, grants an understanding of the study of formal languages proper. And the philosophical, historical, and epistemological questions associated with this field of study are considered in classes on the philosophy of language. A senior thesis synthesizes these approaches, using the learned techniques and facts of formal language study to contribute to one such framework.