Computability Theory

Course Title: Topics in Logic—Computability Theory
Course Number: PMATH 930
Instructor: Barbara F. Csima
Prerequisites: Ability to do proofs.
Text: *Turing Computability: Theory and Applications* by Robert I. Soare.

This will be an introduction to Computability Theory.

We will begin with a brief introduction (review) of Turing machines to help introduce the computable and computably enumerable sets, and computable and partial computable functions. We then introduce the notion of Turing reducibility, which gives rise to a partial ordering on sets of natural numbers. We examine this ordering, often restricting our attention to the computably enumerable sets. Along the way we introduce common proof techniques used in Computability Theory, such as the finite and infinite injury priority methods and forcing using an oracle.

At the end of the course we give some examples of current research in Computability.

Notes: Aside from the first two weeks, none of the material overlaps with other course offerings in the Faculty. This course would be of interest to graduate and advanced undergraduate students in PMATH, C&O and CS.