

MATH 712  
Section 0101  
Fall, 2017

## Mathematical Logic

MWF 1:00–1:50  
MTH 2300  
C. Laskowski

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**Hours:** Wednesdays, 11:00-12:00 or by appointment.

**Class webpage:** [www.math.umd.edu/~mcl/712/Fall17/index.html](http://www.math.umd.edu/~mcl/712/Fall17/index.html)

This is a first course in Mathematical Logic, with an emphasis on model theory and how it relates to other areas of mathematics. We define structures, languages, theories, embeddings, and elementary embeddings. We describe ways of forming new structures from old, including direct limits and ultraproducts. We use the latter to prove the Compactness theorem, from which we deduce results in many distinct branches of mathematics. We discuss quantifier elimination and its variants in order to determine the family of definable subsets of classical mathematical objects. We analyze spaces of types in a topological setting and prove the Omitting types theorems. These tools allow us to prove many theorems about classes of countable models. As the field of model theory is rather young, even though this is a first course, we will be able to state many open problems.

**Texts:** Nothing required. Recommended texts are Dr. Kueker's notes (downloadable from class webpage) Model theory: An introduction by D. Marker, A course in model theory by K. Tent and M. Ziegler, and Model theory by C. C. Chang and H. J. Keisler.

**Homework:** During the term, there will be 10-12 homework sets. Some consultation with other students is permitted.

**Exams:** There will be both a Midterm exam and a Final exam. We will discuss and vote on whether these should be in-class or take-home exams. Depending on which option is chosen, the Final exam will either be given Thursday, December 14 from 1:30–3:30, or the take-home exam will be due at 1:30pm on December 14. If the take-home option is chosen, it is expected that all students do the problems on their own, without assistance from other students.