

DEPARTMENT OF MATHEMATICS

ORAL EXAMINATION

Major Area: LOGIC AND CATEGORY THEORY

References: P.J. Freyd and A. Scedrov. Categories, Allegories.
J. Lambek and P.J. Scott. Introduction to Higher Order Categorical Logic

Topics: Categories, Functors, Natural Transformations
Adjoint Functors, Equivalence of Categories
Limits and Colimits
Yoneda Lemma and Yoneda Embedding
Cartesian Closed Categories
Scoping
Completeness for Simply Typed Lambda-Calculus
Church-Rosser Property, Strong Normalization
Scott's Model of Untyped Lambda-Calculus
Regular Categories
Henkin-Lubkin Theorem
Monads
Kleisli and Eilenberg-Moore Categories
Sheaves
Pre-Logoi, Pre-Topoi
Axiom of Choice and Boolean Pre-Topoi
Logoi and Their Internal Language
Logos Semantics
Geometric Representation Theorem
Goedel's First and Second Incompleteness Theorems
Cut Elimination