DEPARTMENT OF MATHEMATICS

ORAL EXAMINATION

Major area: CATEGORY THEORY

Sources:
Barr, Wells - Toposes, Triples and Theories
MacLane - Categories..., Chapters 1-6
Tennison - Sheaf Theory, Chapters 1-3

Topics:
Categories, Functors, Natural Transformations
Elements and Subobjects
Yoneda Lemma and Yoneda Embedding
Limits and Colimits
Adjoint Functors
Toposes and their Properties
Presheaves and Sheaves of Sets
Beck Conditions
Triples
Kleisli and Eilenberg-Moore Categories
Tripleability
Beck's Theorems
Duskin's Theorem
Sketches and Theories
Logical and Geometric Functors
Slices of a Topos
Cartesian Closedness
Heyting Algebra Structure of Subobjects
Topologies on a Topos and sheaves
Left Exact Triples and Cotriples
Internal Categories
Grothendieck Topologies
Girauds Theorem
Representation Theorems
Axiom of Choice in a Topos
Delignes Theorem
Natural Numbers in a Topos
Barr's Theorem