I expect to get rather further than the catalog description: “Categories, duality, special morphisms, functors, natural transformations, limits and colimits, adjoint situations, and applications,” and to cover a least the beginnings of “higher category theory” including n-categories, monoidal categories and bicategories. And, while it might be nice for students to have the formal prerequisites listed in the catalog (701 and 730), anyone in our graduate program, and any advanced undergrads who have a solid background in algebra and even a passing familiarity with any kind of topology, should be able to do well and benefit from the course. If iSIS has been fitted with prerequisite-checking routines, I will give any of our grad students and any undergrads with the necessary background permission to enroll.

Examples of categories are found throughout mathematics, both “large” categories like \textbf{Sets}, \textbf{Groups}, \textbf{C*-algebras}, . . . whose objects are the mathematical gadgets which name the category and whose “arrows” are the structure preserving maps, set functions, group homomorphism, *-homomorphisms, . . . , and “small” categories including categories of tangles, partially-ordered sets reimagined as having a unique arrow from a larger element to a smaller, or groups, reimagined as “an object” with the elements of the group as arrows.

Category theory has two faces, one as a part of foundations of mathematics, the other as a kind of algebra. Categorical concepts are pervasive in algebraic geometry, algebraic topology, some parts of theoretical computer science, and newer areas like TQFT and the theory of quantum groups that span the boundaries between algebra, topology and physics.

The course will begin at the beginning with the most basic concepts and track toward the more algebraic, less foundational view. Students preparing to take the Algebra Qualifying Exam will find some of the material helpful in preparing for questions that involve freeness or other universal properties.

I will offer two options for earning a grade: either turning in exercise sets or giving a presentation on a categorical topic (everyone will have the option to do either or some combination of the two, but advanced students using, or considering using, categorical ideas in their dissertations will be encouraged to give a presentation, and students yet to pass quals will be encouraged to turn in exercises).

The recommended text will be Saunders Mac Lane's \textit{Categories for the Working Mathematician}, but the course will not follow it too closely, and exercise sets will either be distributed by e-mail or written on the board.