Kurzus kódja: **BMA-LOTD-326.02, BMI-LOTD-326E.02**
Kurzus megnevezése: Algebrai logika, kategóriaelmélet II: Kategóriaelmélet
Kurzus megnevezése angolul: Algebraic logic, category theory II: Category theory
Kurzus időpontja és helye: Kedd 14:00-15:30 (i.ép II.em 224) (ez még változhat)
Kurzus előadója: Kanalas Kristóf

Oktatás célja
If algebraic logic is something like encoding first-order theories into cylindric algebras, in order to translate logic questions to universal algebra, then categorical logic is something like encoding first-order theories into coherent categories and Grothendieck toposes, in order to apply the rich toolkit of category theory within logic.

Tantárgy tartalma
- Categories, functors, natural transformations. Yoneda lemma.
- Limits and colimits. A category with products and equalizers has all limits. Filtered colimits.
- Presheaf categories. Limits and colimits of presheaves. The Yoneda embedding preserves limits. Every presheaf is the colimit of representables. Lex presheaves are exactly the filtered colimits of representables.
- Application of colimits: small object argument. Application of the small object argument: every module embeds to an injective one (in particular every abelian group embeds to a divisible abelian group).
- Adjoints and Kan extensions. Examples.
- Categorical logic, semantic side: accessible categories. If an accessible category has all limits then it has all colimits.
- Categorical logic, syntactic side: coherent categories, sites. Every \kappa-accessible category can be axiomatized by a \kappa-site. Grothendieck toposes. Sheaves on topological spaces, sheaves on sites. Examples. Site morphisms, geometric morphisms. Comparison lemma.
- If time permits: Scott adjunction, Simon Henry's proof, that the category of at least \lambda big sets and monomorphisms is not equivalent to the category of models of a theory in L_{\infty \kappa } (for \kappa < \lambda regular).

Számonkérési és értékelési rendszere Solving exercises during the semester.

Irodalom There will be lecture notes (eventually).