MATH 488, Syllabus for the Final Exam

(1) well-orders, well founded orders, ordinals, cardinals
(2) ordinal arithmetic, cardinal arithmetic,
(3) Cantor's theorem, Cantor–Schröder–Bernstein theorem,
(4) cofinality, König's theorem
(5) set models, absoluteness, hierarchy of formulas,
(6) reflection theorem,
(7) ranks, von Neumann hierarchy, the hierarchy $H(\kappa)$,
(8) strongly inaccessible cardinals,
(9) constructible universe, structure of the hierarchy of L_α,
(10) continuum hypothesis in L,
(11) Axiom of Choice and its various equivalent forms: the Well-Ordering Principle, Zorn's lemma,
(12) equidecomposability in group actions,
(13) the Banach-Tarski paradox,
(14) ultrafilters: definitions, existence, properties,
(15) the topology on the space of ultrafilters (the Čech–Stone compactification of a discrete space): compactness,
(16) ultrafilters on semigroups: semigroup structure on the space of ultrafilters,
(17) the Ellis–Numakura theorem,
(18) applications of ultrafilters in combinatorics: the Hindman theorem, the Hales–Jewett theorem,
(19) forcing: generic filters, names
(20) generic extensions,
(21) Rasiowa–Sikorski lemma, forcing over countable transitive models,
(22) forcing relation, forcing theorem,
(23) Boolean-valued models,
(24) Cohen forcing and Cohen reals,
(25) forcing with finite partial functions,
(26) Δ-lemma and ccc posets,
(27) forcing notions preserving cardinals,
(28) nice names,
(29) consistency of the negation of CH.