1. Logic

1.1. Model Theory.
   - Basics
     - Compactness, Lowenheim-Skolem theorems, Tarski-Vaught Test
   - Fraïssé
     - General theory
     - Quantifier elimination
     - Existence proofs
     - Classification (homogeneous tournaments)
     - Homogeneous k-dimensional permutations
   - $\aleph_0$-Categoricity
     - Omitting types
     - Atomic, prime, homogeneous, and saturated models
     - Oligomorphic automorphism group
   - Order Indiscernibles
     - Existence
     - Locally finite quadrangles
     - Stability implies true indiscernibles
   - Morley Rank
     - Definition in terms of types (Cantor-Bendixson)
     - Definition in terms of definable sets
     - $\aleph_1$-categoricity $\Rightarrow \aleph_0$-stability $\iff$ Morley rank is defined
     - Rank 1, degree 1 $\iff$ strongly minimal
     - Strongly minimal geometry
     - Strongly minimal $\Rightarrow \aleph_1$-categorical

1.2. Descriptive Set Theory.
   - Polish Spaces
     - Borel isomorphism theorem
     - Borel-generated topologies, Ramsey-Mackey theorem
     - Sequential trees
   - Borel and Projective Hierarchies
     - Basic definitions and facts, including closure properties
     - Existence of universal sets, non-collapsing
     - Every Polish space contains an analytic set that is not Borel
     - Equivalence of various definitions of analytic sets
     - Regularity properties of analytic sets
1.3. **Forcing.**
- Statements of fundamental forcing theorems
- Force CH, force ¬CH, force ♦
- Chain and closure conditions
- Cohen forcing
- Martin’s axiom
- Product forcing
- Easton’s theorem

2. **Combinatorics**
- **Enumeration:** bijections, binomial and multinomial coefficients, generating functions, recurrence relations, inclusion-exclusion
- **Extremal Results:** Sperner’s theorem, Dilworth’s theorem, Erdos-Ko-Rado
- **Probabilistic Method:** linearity of expectation, union bound, Chebyshev’s inequality, Chernoff bounds, Lovasz local lemma
- **Ramsey Theory:** Ramsey, infinite Ramsey, probabilistic lower bounds, statement of van der Waerden
- **Linear Programming:** duality, combinatorial min-max theorems
- **Entropy:** basic properties, Shearer’s lemma, Bregman’s theorem
- **Algebraic Methods:** Schwartz-Zippel Lemma, Combinatorial Nullstellensatz