

CALIFORNIA STATE UNIVERSITY, SACRAMENTO
Department of Mathematics and Statistics

SYLLABUS

Math 220A: Point Set Topology; continuity; compactness; connectedness

Prerequisite: Math 130B, Fall only

Math 220B: Metric spaces; Function spaces; Homotopy theory

Prerequisites: Math 110A and Math 220A, Spring only

OUTLINE: Math 220A

*Optional Topics

- I. Topological Spaces 5 Weeks
 - a. Basis for topology
Topological space
 - b. Open sets, closed sets
Limit points
 - c. Continuous functions
 - d. Order topology
 - e. Product topology
 - f. Metric topology
 - g. Quotient topology
- II. Connectedness and Compactness 3 Weeks
- III. Countability and Separation Axioms 4 Weeks
 - a. 1st and 2nd Countable
 - b. T_0 , T_1 , Hausdorff, regular, etc.
 - c. Urysohn Lemma
- IV. Metrization Theorems and Dynamic Topology 3 Weeks
 - a. Mappings
 - b. Completely regular spaces
 - c. Extension Theorems
 - * d. Urysohn Metrization theorem
 - * e. Compactifications

OUTLINE: Math 220B

*Optional Topics

- I. More on Metric Spaces and Function Spaces 2 Weeks
 - a. Complete metric spaces
 - b. Function spaces with topologies
 - a) pointwise convergence
 - b) uniform convergence
 - c) compact-open

- II. Homotopy Theory 9 Weeks
 - a. Paths
 - b. The fundamental group
 - c. Covering spaces
 - d. Essential and inessential mappings
 - e. Surfaces
 - f. Homotopy type
 - * g. Fixed points
 - * h. Vector fields

- III. Higher Dimensional Homotopy 4 Weeks
 - a. Homotopy groups
 - * b. Simplexes
 - * c. Barycentric subdivisions
 - * d. Induced homomorphisms