MATH 247, WINTER 2006: SYLLABUS

This is an approximate outline of topics we will cover.

- the real line $\mathbb{R}$: ordered fields, completeness; functions: cardinality; Euclidean space $\mathbb{R}^N$: distance, inner product, convex subsets.
- topology: open sets, closed sets, boundedness, cluster points – Bolzano-Weierstrauss theorem, compactness – Heine-Borel theorem, connectedness.
- sequences: limits, subsequences; functions: limits and continuity, preservation of compactness and connectedness, uniform continuity.
- differentiation: partial derivatives, total differentiability: chain rule; Taylor's theorem, stationary points.
- integration: Jordan content, Riemann integration, Fubini's theorem.
- local properties of $\mathcal{C}^1$-functions: open mapping theorem, implicit function theorem.

Pace: We will cover about 130 pages of *Math 247 Lecture Notes*, namely, most of the first 5 chapters. We will cover about 10 pages per week, more in weeks where the material is simpler.