Topics covered, Math 4111, Analysis, Fall 2013

Aug 27: Basic set theory and functions, Natural Numbers and induction.

Aug 29: Division Algorithm, Greatest common divisor, Prime numbers, Fundamental Theorem of Arithmetic, Least upper bound.

Sep 3: Sequences and limits.

Sep 5: Cauchy sequences and convergence. Geometric series and exponential function.

Sep 10 Countability and uncountability.

Sep 12 Complex Numbers, $e^{x+y} = e^x e^y$.

Sep 17 Metric Spaces, Open and Closed sets, Accumulation and Adherent points, Open Covers, Compact sets, First countability.

Sep 19 Second countability of $\mathbb{R}^n$, Lindelof Covering Theorem, Bolzano-Weierstrass Theorem.

Sep 24 Heine-Borel Theorem, Open intervals of $\mathbb{R}^1$, Connectedness.

Sep 26 Complete metric spaces, Limits of functions, Continuity, Examples.

Oct 1 Image of a compact set is compact and connected set is connected under continuous maps.

Oct 3 Open maps, closed maps, homeomorphisms. Examples. Polynomial maps from real line to itself are closed.

Oct 8 Surjectivity of odd degree polynomials, openness of $f(x) = x^n$ where n is odd, Uniform continuity.

Oct 10 Uniformly continuous functions are continuous and the converse holds for compact spaces. Arcwise connectedness and it implies connectedness. Converse holds for open subsets of $\mathbb{R}^n$. I have also asked you to read the two sections on 'Contractions' and Monotonic functions'.