Math 320/101 **Real Variables I** **Sep-Dec, 2015**

Instructor: Dr. G. Slade, Math Annex 1211, 604-822-3781, `slade@math.ubc.ca`.

Office hours: Mon. 14:00–14:50, Wed. 13:00–13:50, Fri. 10:00–10:50.

Course website: `http://www.math.ubc.ca/~slade/math320/320-web-15.html`

Text: Walter Rudin, "Principles of Mathematical Analysis" 3rd edition, McGraw Hill, 1976.
Other references:
Tom M. Apostol, "Mathematical Analysis"
Maxwell Rosenlicht, "Introduction to Analysis"
Arthur Mattuck, "Introduction to Analysis"
Kenneth Ross, "Elementary Analysis: The Theory of Calculus"
William F. Trench, "Introduction to real analysis" `http://ramanujan.math.trinity.edu/wtrench/texts/TRENCH_REAL_ANALYSIS.PDF`.

Topics: The course will be based primarily on topics from the first five chapters of Rudin:

1. Number Systems (Chapter 1): ordered fields; rational, real and complex numbers; Archimedian property; supremum, infimum, completeness.

2. Sequences and Series of Real Numbers (Chapter 3): limits of sequences; algebra of limits; Bolzano–Weierstrass Theorem; Cauchy sequences, liminf, limsup; limits of series, convergence tests, absolute and conditional convergence; power series.

3. Metric Spaces (Chapter 2): metric spaces; convergence, completeness, completion; open sets, closed sets, compact sets, Heine Borel Theorem; connected sets.

4. Continuity (Chapter 4): functions, cardinality; continuity; continuity and compactness, existence of minimizers and maximizers, uniform continuity; continuity and connectedness, Intermediate Value Theorem; monotone functions and discontinuities.

5. Differentiation (Chapter 5): differentiation; Mean Value Theorem; L'Hôpital's Rule; Taylor's Theorem.

Evaluation: There will be homework assignments, two tests, and a final exam.

Homework: Nine assignments will be given and marked for credit. Assignments are due at the beginning of class on the due date. *No late assignments will be accepted.* The assignment schedule is as follows:

Assignment given	Assignment due
September 11	September 18
September 18	September 25
September 25	October 2
October 2	October 9
October 16	October 23
October 23	October 30
October 30	November 6
November 6	November 13
November 20	November 27

Tests: There will be two 50-minute tests held during the regularly scheduled class hours on the following dates:

Wednesday, October 14, Wednesday, November 18.

The midterms and final exam are closed book: no calculators, formula sheets, or other aids are permitted. Missing a test normally results in a mark of zero. Exceptions may be granted in two cases: prior consent of the instructor or a medical emergency. In the latter case, the instructor must be notified within two working days of the missed test, and presented with a doctor's note immediately upon the student's return to UBC. When an exception is granted for a missed test, there is no make-up test, and the final exam mark will be used.

Final exam: There will be a final examination during the December examination period.

Final mark: The final mark will be calculated (subject to possible scaling) as follows:

Homework: 10%
Tests: 20% each
Final exam: 50%

Prerequisites: Either (a) a score of 68% or higher in MATH 226 or (b) one of MATH 200, MATH 217, MATH 226, MATH 253, MATH 263, and a score of 80% or higher in MATH 220.

Updated August 6, 2015.