Math 320 Section 101 Real Variables I 2024W Term 1, Sep-Dec, 2024

Credit value: 3

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

Teaching assistant: Contact Jun Jie Zhu for concerns about marking `jzhu@math.ubc.ca`.

Office hours: See Canvas for details.

Course materials are found on Canvas: `https://canvas.ubc.ca/courses/146723`

Piazza: There is a link to Piazza on Canvas. Please use Piazza for questions that arise in your learning and for questions about all issues related to the course. For private matters, contact Dr. Slade in person or by email.

Text: Walter Rudin, "Principles of Mathematical Analysis" 3rd edition, McGraw Hill, 1976.
Solutions manual is here: `http://digital.library.wisc.edu/1793/67009`.

Another reference: Tom M. Apostol, "Mathematical Analysis"

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

3. 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.

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 to be submitted on Canvas by 08:59 a.m. on the due date. This is a strict deadline: *no late assignments will be accepted.* The assignment schedule is as follows:

Assignment given	Assignment due
September 6	September 13
September 13	September 20
September 20	September 27
September 27	October 4
October 11	October 18
October 18	October 25
October 25	November 1
November 1	November 8
November 22	November 29

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

Friday, October 11, Friday, November 22.

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% (best 8 assignment marks)
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.

Course policies: You are encouraged to discuss assignment problems with each other; it is a good way to learn. However, the solutions that you write up should be in your own words. Never copy your solutions from each other. If you find a solution on the internet, a book, or elsewhere, cite your source.

The midterms and final exam are closed book: no calculators, formula sheets, or other aids are permitted.

Missing an assessment without a valid reason results in a mark of zero. Missing an assessment for a valid reason normally results in the weight of that assessment being transferred to the final exam. Examples of valid reasons include illness and travel to play a scheduled game for a varsity team. Examples of reasons that are not valid include conflicts with personal travel schedules or conflicts with work schedules. Any student who misses an assessment is to present to their instructor the Department of Mathematics self-declaration form for reporting a missed assessment within 72 hours of the assessment date. The form is here: `https://www.math.ubc.ca/undergraduate-academic-concession-form`. This policy conforms with the UBC Vancouver Senate's Academic Concession Policy V-135 and students are advised to read this policy carefully: `http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0`.

General syllabus information: Further information concerning Departmental and University policies can be found here: `https://www.math.ubc.ca/general-syllabus-information`. Please familiarise yourself with these policies.

Updated September 2, 2024.