

Mathematics 3790H – Analysis I: Introduction to analysis

TRENT UNIVERSITY, Winter 2012

Readings and Schedule

The following schedule is *tentative* – no lesson plan survives contact with students! – and our actual pace will be adjusted as necessary. Most the readings below are taken from the textbook, *Elementary Real Analysis*, by B.S. Thomson, J.B. Bruckner, and A.M. Bruckner. (Given as THOMPSON · BRUCKNER² on the cover page. :-) The textbook will occasionally be supplemented in class and on assignments with handouts or references to sources available online. It would be very much to your advantage, if possible, for you to read the given parts of the textbook before we cover them in class.

Week 1. (9–13 January, 2012.) §1.4–1.7: Order properties of the real numbers, suprema and infima, the Archimedean property. It would be a good idea to read through the rest of Chapter 1, partly for review and partly to make sure you get a sense of the authors' preferred notation. *There will be a seminar this week.*

Week 2. (16–20 January, 2012.) §2.1–2.2, 2.4–2.6: sequences, convergence and divergence of sequences, bounded sequences. Quiz #1 written in lecture on Monday, 16 January; Assignment #1 due on Thursday, 19 January.

Week 3. (23–27 January, 2012.) §2.7–2.10: algebraic and order properties of limits, Monotone Convergence Theorem. Quiz #2 written in lecture on Monday, 23 January; Assignment #2 due on Thursday, 26 January.

Week 4. (30 January – 3 February, 2012.) §2.11–2.13: subsequences, Cauchy Convergence Criterion for sequences, upper and lower limits. Quiz #3 written in lecture on Monday, 30 January; Assignment #3 due on Thursday, 2 February.

Week 5. (6–10 February, 2012.) §3.1–3.2, 3.4: finite and infinite series, convergence, summation formulas. [It might be a good idea to review this material from your old calculus notes too.] Quiz #4 written in lecture on Monday, 6 February; Assignment #4 due on Thursday, 9 February.

Week 6. (13–17 February.) §3.5–3.6: boundedness, Cauchy Convergence Criterion for series, absolute convergence, Comparison and Alternating Series Tests, Ratio and Root Tests. [It might be a good idea to review this material from your old calculus notes too.] Quiz #5 written in lecture on Monday, 13 February; Assignment #5 due on Thursday, 16 February.

Winter Reading Week. (20–24 February, 2011.) Enjoy!

Week 7. (27 February – 2 March.) §3.6–3.8: Cauchy's Condensation Test, rearrangements and products of series. Quiz #6 written in lecture on Monday, 27 February; Assignment #6 due on Thursday, 1 March.

Week 8. (5–9 March.) §5.1–5.5: Review of limits and continuity of functions. [It might be a good idea to review this material from your old calculus notes too.] Quiz #7 written

in lecture on Monday, 5 March; Assignment #7 due on Thursday, 8 March. *The last date to drop Winter half-courses without academic penalty is Friday, 9 March.*

Week 9. (12–16 March, 2012.) §5.6, §9.1–9.2: Uniform continuity, pointwise and uniform convergence of sequences of functions. Quiz #8 written in lecture on Monday, 12 March; Assignment #8 due on Thursday, 15 March.

Week 10. (19–23 March, 2012.) §9.3–9.6: Uniform convergence and continuity, as well as differentiability and integrability. Quiz #9 written in lecture on Monday, 19 March; Assignment #9 due on Thursday, 22 March. Take-home final examination distributed on Thursday, 22 March.

Week 11. (26–30 March, 2012.) §7.12, §10.1–10.3: Power series, convergence and uniform convergence of power series. Quiz #10 written in lecture on Monday, 26 March; Assignment #10 due on Thursday, 29 March.

Week 12. (2–6 April, 2012.) §10.4–10.7: Representing functions using power series, Taylor’s Theorem, products and composition of power series. Possible Quiz #11 written in lecture on Monday, 2 April; Possible Assignment #11 due on Thursday, 5 April.

Winter final examination period. (9–24 April, 2011.) Take-home final examination due on Friday, 20 April.