

The University of Northern British Columbia
College of Science and Management
Mathematics Program

MATHEMATICS 302-3
THEORY OF METRIC SPACES

Course Outline

Fall 2009

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Prerequisites. MATH 200-3 and MATH 224-3

Strongly recommended prerequisite. MATH 201-3

Textbook. PRINCIPLES OF MATHEMATICAL ANALYSIS by Walter Rudin, *Third Edition*, McGraw-Hill, Inc., ©1964, 1976.

Course Description. This course develops the essential components of metric space topology and the related ideas of convergence including convergence of sequences and series of functions. Topics include open, closed, bounded and compact sets in a metric space, the Bolzano-Weierstrass and Heine-Borel Theorems [both on page 40], continuous and uniformly continuous functions, uniform convergence.

Main Chapters. The course will essentially cover material from Chapters 1, 2, 3, 4, and the first part of 7. Chapter 1 is largely a review of prerequisite material.

Grading Scheme. Your final grade Γ will be computed according to the weight function

$$\Gamma = .35\mathcal{H} + .15\mathcal{T}_1 + .15\mathcal{T}_2 + .35\mathcal{F}$$

where \mathcal{H} is the average of your homework grades, $\mathcal{T}_1, \mathcal{T}_2$ are your grades for tests 1 and 2, and \mathcal{F} is your final examination grade (all grades being in percentages).

Test Dates.

- Test 1: Wednesday October 14, 2009
- Test 2: Wednesday November 18, 2009
- Final Exam: To be set by the UNBC Registrar's Office

Homework Assignments: When handing in your assignments, please observe the following:

- (1) Write your solutions on one side of each page only, clearly and neatly.
 - (2) Provide a front cover containing your name, course name & number, assignment number, and the date.
 - (3) Staple your assignment (do not use paper clips).
- Thank you in advance for this.

Suggested Problems (from Rudin's book). It is important that all students do all the problems listed below so as to gain the necessary experience with the subject matter. These problems, or ones similar to them, could appear in homework problems, tests, and final. As the list is not complete, more problems will be added to it in due course.

Chapter 1: 1 2 4 5 8 9 10 12 13 14 16a

Chapter 2: 1 2 3 4 5 6 7 8 9acf 10 11

Chapter 3: 1 2 3 4 6 7 8 9

Chapter 4: 1 2 3 4

Ethical Conduct. It is every student's responsibility to work and study in an ethical manner. Please read Section 44, "Academic Offences," of the UNBC Undergraduate Academic Calendar. This section may be found at

<http://www.unbc.ca/calendar/undergraduate/general/regulations.html>

in the online calendar. This section explains the possible penalties for academic misconduct. I trust, of course, that nothing like this will happen. Virtually all students I met have been honest, respectful, and with great integrity.