
Joseph W. Jerome

Text: An Introduction to Analysis
Author: William R. Wade
Publisher: Pearson/Prentice-Hall (3rd. Ed.)

Content and Protocol

- Core material: Selections made from the following sections.
- Additional topics as time permits:
  9.5 (Dini’s theorem and Lebesgue’s theorem)
- General remarks

1. Section 8.1 is a review section, and will be discussed in the first lecture and part of the second lecture. Familiarity with this material is assumed for later sections. Similarly, section 8.2 is a review section, and will be treated as such when it is considered.

2. First meeting: January 3. No lecture on January 15, the holiday commemorating Dr. Martin Luther King, Jr. Accordingly, the reading period is abbreviated this quarter; it begins on March 8. This date was set in the Fall in a memo from Mary Finn of WCAS.

3. Lecture format: To permit regular classroom discussion, lectures will be presented via the overhead projector/screen with written transparencies. Lectures will conclude at approximately 40 minutes past the hour to allow the remaining time for discussion. Since office hours will not be tutorial, this is the designated time for questions and comments. My handwritten lectures, corresponding to sections of the text, will be posted sequentially on Blackboard as they are completed. Sometimes alternative proofs will be employed, as discussed below. Only those parts of the text covered in lectures will
be defined as required reading, with the exception of examples specified on Blackboard, and an occasional remark or result which will be brought to your attention. This will be made clear via Blackboard as the course progresses.

- Remarks on the material

1. Chapter eight: Review concepts deal with the algebraic and geometric structure of $\mathbb{R}^n$ in section 8.1, and linear transformations in section 8.2. New concepts deal with the topology of $\mathbb{R}^n$ in sections 8.3 and 8.4. Connected sets will be defined, but not investigated in detail.

2. Chapter nine: Some material (limits of sequences and functions in $\mathbb{R}^n$) utilizes corresponding concepts in $\mathbb{R}$, introduced in the Fall. Familiarity with these concepts will be assumed. New ideas include the incorporation of the topology of $\mathbb{R}^n$ into the analytical formulation of continuity. The highlight of the chapter is the Heine-Borel theorem, for which an alternative proof will be given in the lectures. This will be the preferred proof. The corresponding text proof is not required reading.

3. Chapter eleven: Differentiability of vector-valued functions with domains in $\mathbb{R}^n$ is defined and explored. One-dimensional differentiation theory is assumed from the Fall. The multi-dimensional mean value theorem and the chain rule are proven. Highlights include the inverse and implicit function theorems, and the Lagrange multiplier theorem. The lectures will provide an independent proof of the inverse function theorem. This is a very detailed proof, and it will be the preferred proof. As before, the text proof is not required reading.

4. Chapter twelve: Integration is defined on Jordan regions in $\mathbb{R}^n$. Some theory from the one-dimensional case will be assumed. Highlights include Fubini’s theorem. The change of variables formula of section 12.4, formerly included in 320-2, is deferred until 320-3.

- Assignments: Posted regularly on Blackboard.

The written homework (to be handed in) will constitute a subset of the posted assignments. Students are permitted (indeed, encouraged) to discuss all assignments, including those to be handed in. However, final written assignments must be individually prepared.
Grade Determination

- Midterms (17.5% ea.) January 30, February 27.
  The two midterm examinations will involve proofs (40%), examples from
  the text and lectures, and assigned problems. Keys are not provided for
  these exams, but grading explanations in the blue-books will be.

- Written homework (20%) due: (Tuesdays) January 16, January 23, February
  6, February 13, February 20
  Each assignment of written homework will include three or four problems,
  of which two will be graded. Keys will not be provided, but Ms. Jung
  may choose to discuss some of these problems on the Tuesdays they are
  handed in.

- Individual meetings (10%), four times during the quarter, of 10–15 minutes
  duration. These will assess your progress in the course.

- Final exam (35%): Friday, March 16.

Miscellaneous

Hyunmi Jung, who is completing her doctoral dissertation, is the teaching as-
ssistant for the quarter (Tel. 7-1953; office: Lunt B11). She will conduct the
Tuesday discussion sections, and will announce her office hours via email. Please
confine your questions, whether during her office hours or during discussion sec-
tions, to the assigned problems only.

My office hours (Tel. 1-5575; office: Lunt 213) will consist of the individ-
ual assessment meetings. Office hours are not tutorial. Questions concerning
the lecture material should be raised during the lectures in the allotted time.
Every student is requested to participate at least once each week. Balanced
participation is essential for a successful course.