Portland State UNIVERSITY

FARIBORZ MASEEH DEPARTMENT OF MATHEMATICS + STATISTICS

MATH 312:001 CRN 80779

Introduction to Mathematical Analysis II

Summer 2017
T, Th 9:15–11:35am, NH 385

Instructor: Dr. Gerardo Lafferriere

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Web Homepage: `http://web.pdx.edu/~gerardol`. Please note that most of the material will be posted on the D2L site for the course (`https://d2l.pdx.edu`).

Office Hours: Tuesdays and Thursdays 8:00 –9:00 (or by arrangement).

Textbook: *Analysis with an Introduction to Proof* by Steven R. Lay Fifth Edition. We will cover chapters 7, 8 & 9 as well as some addition topics as time allows. See the tentative daily course plan available on-line.

Learning Goals: This course is continuation of Mth 311. It is an introduction to the foundations of mathematical analysis. We will provide a rigorous presentation of the main results from the theory of the calculus. The course is also a bridge to advanced mathematics, teaching the students along the way how to write correct proofs in analysis.

Learning Objectives: Upon completion of this course the student should be able to:

1. State, prove and apply the major theorems of Riemann integrability of functions of a single real variable including the Fundamental Theorem of Calculus and existence of the Riemann integral,
2. State, prove and apply the major theorems concerning pointwise convergence of infinite series of real numbers,
3. State, prove and apply the major theorems concerning pointwise and uniform convergence for sequences and series of functions including power series.

Grading: will be based on five quizzes (30%), one midterm exam (30%), a final exam (30%) (**August 17**) and class participation (10%).

Homework and Quizzes: As material is covered in class, a list of accompanying homework will be assigned in class and posted in D2L. Reading the text and completing the homework is essential for your success in this course. We will discuss the problems in class. The students will present the solutions on the overhead projector. Write solutions in enough detail for others to follow your arguments. Quizzes will be based on the homework problems. You will be graded not just on a final answer but also on the quality and clarity of your logical arguments.

Exams: The exams and quizzes will be closed-book and no notes or calculators will be allowed. The tests will include both problems to be solved as well as the basic theory developed in class in the form of definitions, examples, and theorems. Exams and quizzes must be taken on the scheduled dates. Make-ups will not be allowed unless proper justification is presented.

Access and Inclusion for Students with Disabilities PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. The DRC is located in 116 Smith Memorial Student Union, 503-725-4150, drc@pdx.edu, http://www.pdx.edu/drc.

If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations. Students who need accommodations for tests and quizzes are expected to schedule their tests to overlap with the time the class is taking the test. Please be aware that the accessible tables or chairs in the room should remain available for students who find that standard classroom seating is not useable. For information about emergency preparedness, please go to the Fire and Life Safety webpage (http://www.pdx.edu/environmental-health-safety/fire-and-life-safety) for information.

Other: Voice or video recording of the classes is not permitted without the explicit written consent of the instructor.

Topics

- Integration
  - Riemann integration on R
  - Integrability criteria
  - The Fundamental Theorem of Calculus
  - Improper integrals
- Series of Real Numbers
  - Series with nonnegative terms, convergence tests
  - Cauchy sequences
  - Absolute convergence
  - Alternating series
- Series of Functions
  - Pointwise and uniform convergence of sequences of functions
  - Uniform convergence of series, Weierstrass M-test
  - Power series, term-by-term differentiation and integration
  - Representation of functions by power series