

# Youngstown State University

## Department of Mathematics and Statistics

### Course Outline for Mathematics 3751/5851

Course Title: Real Analysis I

Course Credit: 3 s.h

Text: Lay, Steven, Analysis: With an Introduction to Proof, 4<sup>th</sup> ed., Pearson Prentice Hall

Course Prereq: MATH 2673 and 2683

Course Description: Introduction to the properties of the real number system and metrics and metric properties, with critical analysis of limits, continuity, differentiability, integration, and other fundamental concepts underlying the calculus.

Course Objectives:

- developing an understanding of the fundamental concepts of real analysis.
- developing the ability to read and understand mathematical definitions, theorems, and proofs
- demonstrating the ability to communicate in mathematics and produce well-written proofs

Course Assignments

Topics:

Chapter 3: Real numbers, suprema and infima, Archimedean property, density of rationals, triangle inequality, topological properties of sets of real numbers.

Chapter 4: Sequences of real numbers, convergence, Cauchy convergence criterion

Chapter 5: Continuous functions and limits, Extreme Value Theorem, Intermediate Value Theorem

Chapter 6: Differentiation, Mean Value Theorem, Intermediate Value Theorem for Derivatives, L'Hospital's Rule, Taylor's Theorem.

Chapter 7: Riemann Integration, Fundamental Theorem of Calculus

Problem Session: In addition to the lectures, a one-hour problem session will be scheduled each week. During these sessions, students have the opportunity to ask questions, discuss problems with classmates and present proofs at the blackboard. No new material will intentionally be covered during the problem sessions. Attendance is optional but strongly encouraged.

Students with Disabilities: In accordance with University procedure, if you have a documented disability and require accommodations to obtain equal access in this course, please contact the Office of Equal Opportunity and Disability Services at the beginning of the semester or when given an assignment for which an accommodation is required. Students with disabilities must verify their eligibility through the Office of Disability Service (330) 941-1372 intake procedure.

Assessment:

- Your grade will be determined by your performance on exams, a final, and homework assignments, which may include an oral or written project.
- An important component of doing mathematics is expressing your ideas in a clear and correct manner. With practice, you will become adept at communicating in mathematics. Responsible collaboration with your peers is encouraged, as it will help you to assess whether you are expressing your mathematical ideas well. It is also important to work independently and turn in your own work.
- The instructor will distribute an attendance policy.

General Education: Please note that this course satisfies the critical thinking requirement of the General Education Program.

Semester: Spring 2007

Last Day to drop the course with a grade of "W": Thursday, March 29, 2007