Prerequisite: A grade of “C” or better in MATH 4381


Some excellent references for introductory real analysis:
1. Principles of Mathematical Analysis, 3rd edition, Walter Rudin (called baby Rudin, standard book in the subject, widely used)
2. Introduction to Real Analysis, 4th edition, Robert Bartle and Donald Shebert (very explanatory)
3. Introduction to Classical Real Analysis, Karl R. Stromberg (lots of examples and problems)

Learning Outcomes: Upon completing this course students should be able to:
1. prove the mean value theorem and the Taylor’s theorem, and apply them in approximating functions;
2. define the Riemann integral, and prove elementary properties of the Riemann integral and the fundamental theorem of calculus;
3. prove convergence tests of infinite series, and determine the interval of convergence of power series; and

Class Attendance: Regular attendance is expected and will be recorded. Missing a class can leave you a lot behind in the course. You will be responsible for all announcements, assignments and materials presented in class. I will need to report the last day of attendance when submitting final grades.

Course Description: This course is a continuation of the study of functions of a real variable (MATH 4381/Real Analysis I). Topics include the Riemann/Darboux integral, differentiability, sequences and series of functions. The aim of the course is to provide the students with a deeper understanding of the notions of sequences/series, integrability, and differentiability of functions of a real variable, as well as their properties and interconnections. While developing these concepts, we will focus on understanding and writing formal proofs, as well as emphasize their applications.

Topics to be covered:

Chapter 5 Limits and Continuity
5.4 Uniform Continuity

Chapter 6 Differentiation
6.1 The Derivative
6.2 The Mean Value Theorem
6.3 L’Hospital’s Rule
6.4 Taylor’s Theorem
Chapter 7 Integration
   7.1 The Riemann Integral
   7.2 Properties of Riemann Integral
   7.3 The fundamental Theorem of Calculus
   7.4 Taylor’s Theorem

Chapter 8 Infinite Series
   8.1 Convergence of Infinite Series
   8.2 Convergence Tests
   8.3 Power Series

Chapter 9 Sequences and Series of Functions
   9.1 Pointwise and Uniform Convergence
   9.2 Applications of Uniform Convergence
   9.3 Uniform Convergence of Power Series

If time permits, the following topics will be covered, and supplemental materials will be provided.

Functions of Several Variables
   Continuity and Total derivatives
   Inverse and implicit function theorems

Homework: There will be two types of homework assignments in this course. The first one is for you to exercise for a deeper understanding of content topics. Assignments of this type will not be collected for grading; however, it is imperative that you complete the assignments to develop the skills needed for the second type which will be collected for grading. All assignments will be dynamically posted on D2L as the course progresses.

There will be four homework sets to be collected for grading. These assignments are due at the start of the class on due dates. Homework submitted after the due date but before it has been returned may be accepted with a heavy penalty (usually, 25%, 50%, 75% depending upon how far off the due date). Homework handed in after the class has received the graded homework will not be accepted under any circumstances.

You will be required to trust my professional judgment made for grading homework assignments, midterm exams and the final exam. I will use the following rubric:

- 100% credit for correct solutions with coherent reasoning and full rigor with absolutely no errors;
- 90% credit for correct solutions, but difficult to understand because of incorrect order of arguments, incomplete analysis and unclear interpretations;
- 80% credit for mostly correct with no “damaging” errors; but seriously needing fixes;
- 70% credit for mostly correct, but lacking rigor and needing a rewrite because of “damaging” errors;
- 60% credit for moderately correct; at least the beginning being correct, but the argument losing its track later on; and
- no credit warranted for incorrect, indecipherable and incomplete solutions.

Homework submission guidelines:
- LaTeX is recommended for typesetting the assignments if typed.
- All homework to be graded should be stapled together (credit may be deducted if not).
• Write your name legibly at the top of the first page.
• All problems must be clearly labeled.
• Homework is due at the beginning of the class.
• From each graded homework sets, only selected problems may be graded, but you will be notified of the problems to be graded on the due dates after the homework are submitted.

Students are encouraged to collaborate on homework assignments. However, you are expected to write up your solutions independently. If solutions are found identical to ones of your fellow classmates, you may receive no credit, and may be considered having Academic Misconduct as defined under Code of Academic Integrity as briefed below.

Academic Integrity Statement
Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section 5c of the Student Code of Conduct addresses the University’s policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional issue of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an “informal” resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct’s minimum one semester suspension requirement. See also https://web.kennesaw.edu/scai/content/ksu-student-code-conduct

Grading and Evaluation/Makeup Policy:
Participation = 5%, Homework = 20%, Exam 1 = 25%, Exam 2 = 25%, Final Exam = 25% (The Final Exam is cumulative.)

The participation points will be based on your class attendance for the duration of class time; participating in course content related discussions erupted in class; class presentation as asked by the instructor; and refraining from unwarranted use of electronic devices (e.g. texting, surfing websites). The participation grade for an unexcused absence will be a zero. Repeated use of electronic devices for purposes unrelated to the learning of the course will result in your participation grade of zero. Excused absences will not count against your participation grade.

All exams are closed book and closed notes. Make-up midterm exams will only be given for a university-approved excuse in writing or for an emergent health problem. In the latter case, a note from your doctor’s office must be presented as soon as your returning to KSU. Wherever possible, you should inform the instructor prior to missing an exam. Everyone must take Final Exam. The Final Exam percentage score will be used to replace your one lowest midterm exam score if it helps your average. There will be no extra credit in this course, and therefore please do not ask for one.

Grading Scale:
A for [90%, 100%], B for [80%, 90%), C for [70%, 80%), D for [60%, 70%), F for [0, 60%)
Notice on Course Withdrawal: Students are responsible for maintaining and managing their enrollment status in their classes. A persistent nonattendance does not imply a withdrawal. Per university policy, I will assign a grade of WF to all students who cease to attend the class and do not participate in graded items during or prior to the last two weeks of the semester. The last date of attendance is required to be reported when assigning a grade of WF. Note that my compliance with this policy may affect your financial aid.

Student Disability Services: Any student with a documented disability needing academic adjustments is requested to notify the instructor as early in the semester as possible. Verification from KSU Student Disability Services is required. All discussions will remain confidential.

Classroom Behavior: All phones, tablets, laptops must be put silent for the duration of each class. Music players cannot be used for the duration of class or testing. You are expected to arrive in class on time, be prepared for learning, and not be disruptive during the class. You may be asked to leave classroom for any misconduct or inappropriate behavior.

Important Dates:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>Jan. 7</td>
<td>First Day of Spring Classes</td>
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<tr>
<td>Jan. 21</td>
<td>Martin Luther King Jr. Day</td>
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<tr>
<td>Feb. 27</td>
<td>Withdrawal Deadline</td>
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<tr>
<td>Apr. 1-5</td>
<td>Spring Break</td>
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<tr>
<td>Apr. 29</td>
<td>Last Day of Spring Classes</td>
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<td>Feb. 19</td>
<td>Exam 1</td>
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<td>Apr. 11</td>
<td>NCUR conference at KSU</td>
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<td>Apr. 23</td>
<td>Exam 2</td>
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<tr>
<td>May 2</td>
<td>Final Exam (1:00 PM – 3:00 PM)</td>
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The instructor of the course reserves the right to make changes on pages 1-4 of this syllabus if it is necessary to account for ineluctable circumstances. In such events, the instructor will notify students of any changes at their students.kennesaw.edu address at least one week prior to the dates the changes take effect.