Math 117: Methods of Analysis

TR 9:30-10:45 AM (NH 1105)

Instructor: Xin Zhou
Email: zhou@math.ucsb.edu
Office Hours: Tuesday 3:00-5:00 PM, Thursday 2:30-3:30 PM at South Hall 6501

Teaching Assistant: David Wen
Email: dwen@math.ucsb.edu
Office Hours: Mondays and Wednesdays 1-2PM,
             Mathlab hours in SH1607 on Thursdays from 5PM-7PM.

Textbooks:

Prerequisites: Math 8

Course Objectives: natural numbers, rational numbers, real numbers, completeness axiom, infinity, limits of sequences, limit theorems, monotone sequences, Cauchy sequences, subsequences, series, series tests, continuous functions, uniform continuity

Syllabus: The lectures will explore the following material, presented in the corresponding sections of the textbook. This schedule may be revised depending on how the course material goes.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Sections</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/28</td>
<td>1, 2</td>
<td>natural numbers, rational numbers</td>
</tr>
<tr>
<td>10/3, 10/5</td>
<td>3, 4</td>
<td>ordered fields, real numbers, completeness</td>
</tr>
<tr>
<td>10/10, 10/12</td>
<td>4, 5, 7</td>
<td>completeness, $\infty$, limits</td>
</tr>
<tr>
<td>10/17, 10/19</td>
<td>7, 8</td>
<td>limits, proofs, problem discussion</td>
</tr>
<tr>
<td>10/24, 10/26</td>
<td>9, 10</td>
<td>limit theorems, monotone sequences</td>
</tr>
<tr>
<td>10/31, 11/2</td>
<td>10</td>
<td>lim sup, lim inf, review, <strong>Midterm on 11/2</strong>,</td>
</tr>
<tr>
<td>11/7, 11/9</td>
<td>10, 11, 12</td>
<td>Cauchy sequence, subsequences, lim sup, lim inf (revisit)</td>
</tr>
<tr>
<td>11/14, 11/16</td>
<td>12, 14</td>
<td>problem discussion, series</td>
</tr>
<tr>
<td>11/21</td>
<td>15, 17</td>
<td>alternating series, integral test, continuous functions</td>
</tr>
<tr>
<td>11/28, 11/30</td>
<td>17, 18</td>
<td>continuous functions and properties</td>
</tr>
<tr>
<td>12/5, 12/7</td>
<td>19</td>
<td>uniform continuity, review</td>
</tr>
</tbody>
</table>

Grade Distribution: The course grade will be based on three components: homework, midterm exam, and final exam. The percentages will be:

- Homeworks 30%
- Midterm Exam 30%
- Final Exam 40%

Letter grades for the class will be determined by the student’s point total. The grade distribution will depend on how well the class performs. It is expected that the median grade in the class will be in the $B-$ range.
Exams: There will be an in-class midterm exam and a final exam.

- **Midterm:** November 2, in class
- **Final:** Tuesday, December 12, 8:00-11:00 am

This exam schedule is not flexible, except in case of a verifiable emergency. If an emergency does arise, please contact the instructor immediately to make other arrangements.

Access to books, notes, calculators, phones, and other such aids will not be allowed during any exam. Photo identification will be required.

Homeworks:

- we plan to have 8 homework sets,
- homework assignments will be posted on Gauchospace,
- the homework assignments should be turned in during the Thursday lecture,
- a selection of the assigned problems will be graded and returned,
- no late homework will be accepted,
- the lowest one homework grade will be dropped and will not count toward the final grade.

Learning the class material begins with lectures and reading but it cannot be completed without working diligently through the assigned homework problems. It is recommended that the problems first be attacked on your own and only later discussed with the instructor, the teaching assistant, and classmates. Aside from contributing directly to the final grade, time spent on homework proves for most students to be the best preparation for exams. It is perfectly acceptable to ask the instructor or TA for advice on how to attack a problem after you have given it serious thought. The final write-up of the homework assignment must be done on your own. Returned homework is a valuable opportunity to learn from your mistakes. As you work to correct your solutions you are of course encouraged to enlist the help of your instructor, TA, discussion section, and friends. In fact, learning to talk about mathematics with your peers is an important lesson for you. After you have solved, or made a serious attempt at a problem, you are encouraged to compare your solutions with those of your classmates.

**Academic Integrity:** Students are responsible for informing themselves of UCSB’s policies regarding academic dishonesty. Students found in violation of the code are subject to penalties ranging from loss of credit for work involved to a grade of F in the course, and possible risk of suspension or probation. For more information about the policies and procedures including information about your rights and responsibilities as a student, see: [http://judicialaffairs.sa.ucsb.edu/AcademicIntegrity.aspx](http://judicialaffairs.sa.ucsb.edu/AcademicIntegrity.aspx)