SYLLABUS: MTH 412/512 Real Analysis

3 credits, 9:00-9:50am MWF, Winter 2016, GLSN 100

Professor Ossiander, Kidder 298B, ossiand@math.oregonstate.edu
Office hours. First week of class: Monday 10:30-11:30am, Thursday 10:30am-12:30pm, and by appointment.
Remainder of term: Monday 10:30-11:30am, Wednesday 10:30-11:30am, 1:30-2:30pm, and by appointment.

Catalog Description: MTH 411/511, MTH 412/512, MTH 413/513
Real Analysis: Topological concepts in metric, normed, and inner-product spaces. Properties of continuous functions, including the Stone-Weierstrass theorem. Introduction to function spaces, contraction mappings, fixed points, and applications. Lebesgue measure and integration in one and several variables, basic convergence theorems, Lebesgue spaces, Fubini’s theorem, and applications to Fourier transforms and probability.

Enforced Prerequisite for MTH 412: MTH 411

Course Content: This course is the second in a 3 term sequence in real analysis. It is assumed that students have have satisfactorily completed the first course in the sequence. The overall goal of the course is to give a systematic and rigorous introduction to real analysis. Topics covered in the first term included some basic properties of metric spaces and an introduction to Lesbesgue measure and integration on the real line. We will build on that foundation in the second term to cover properties of continuous functions, the Stone-Weierstrass theorem, contraction mappings, fixed points, and applications.

The Learning Outcomes expected for students enrolled in this class are as follows.

Students satisfactorily completing MTH 412 should be able to:

- Apply the definitions and theorems of real analysis to construct correct, thorough, and efficient mathematical arguments in the context of real-valued functions.

Students satisfactorily completing MTH 512 should be able to:

- Apply the definitions and theorems of real analysis to construct correct, thorough, and efficient mathematical arguments in the context of real-valued functions.

The goal this term is to cover topics remaining from Parts One and Two of the required text. At the end of this term or the beginning of next we will transition to the text by Richard Bass.
Class plan: New material will be covered in lecture daily with weekly homework assignments due every Friday. There will be one in-class midterm and a comprehensive final examination.

Homework is an important component of the class. It will typically be assigned on Friday and collected the following Friday. Assignments will posted on the class website:
Students are encouraged to discuss problems with other students, but all homework submitted is expected to be written independently. It is also expected that submitted homework is either typeset or written clearly and legibly. Late homework submission is strongly discouraged.

Examinations: There will be one in-class midterm and a comprehensive final exam. The date of the midterm will be announced at least 2 weeks in advance. The final examination is scheduled on Thursday, March 17 from 2:00pm to 3:50pm. There will be no make-up examinations given.

Mastery of the learning outcomes will be assessed for each student via evaluation of homework and examinations. Evaluation of MTH 412 students will be differentiated from that of MTH 512 students.

Grade assignments for the class will be based on the following allocation.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>150</td>
</tr>
<tr>
<td>Midterm</td>
<td>150</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
</tr>
</tbody>
</table>

All students are expected to adhere to OSU’s Student Conduct Code; see http://studentlife.oregonstate.edu/studentconduct/offenses-0.

Statement Regarding Students with Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.