SYLLABUS: MTH 411/511 Real Analysis
3 credits, 9:00-9:50am MWF, Fall 2018, Classroom: TBA

Instructor: Professor Mary Brown, Kidder 4XX, mary.brown@oregonstate.edu
Office hours, MW 10:30-11:30am, F 1:30-2:30pm, and by appointment.

Catalog Description for MTH 411/511: Properties of metric spaces and normed spaces, including $l_p$ spaces. Completeness and applications, including fixed point theorems. Compactness. Equicontinuity and the Arzela-Ascoli theorem. Uniform continuity and uniform convergence, including applications.

Enforced Prerequisites for MTH 411: MTH 312 and MTH 341

Course Content: This course is the first in a 3 term sequence in real analysis. It is assumed that students have previously taken an introductory real analysis course such as OSU’s Advanced Calculus. The goal of the course is to give a systematic and rigorous introduction to real analysis, including: Properties of metric spaces and normed spaces, including $l_p$ spaces. Completeness and applications, including fixed point theorems. Compactness. Equicontinuity and the Arzela-Ascoli theorem. Uniform continuity and uniform convergence, including applications.

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

Students satisfactorily completing MTH 411 should be able to:

- Construct in writing correct, thorough, and direct mathematical arguments using the basic properties of metric spaces.
- Apply the basic fixed point theorems.
- Verify convergence of functional sequences using properties of metric spaces and normed spaces.

Students satisfactorily completing MTH 511 should be able to:

- Construct carefully written correct, thorough, and direct mathematical arguments using the basic properties of metric spaces.
- State, prove, and apply the basic fixed point theorems.
- Verify compactness of subsets of spaces of continuous functions.
- Analyze convergence of functional sequences using properties of metric spaces and normed spaces.

Required Textbook: Real Analysis by N.L. Carothers, Cambridge University Press.

Class plan: New material will be covered in lecture daily with weekly homework assignments.

Homework is an important component of the class. It will typically be assigned on Friday and collected the following Friday. Assignments will be announced in class and posted on Canvas. 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, date TBA, and a comprehensive final exam. There will be no make-up exams.

Mastery of the learning outcomes will be assessed for each student via evaluation of homework and examinations. Evaluation of MTH 411 students will be differentiated from that of MTH 511 students. Typically, the MTH 411 students will have shorter assignments, and/or parts of some problems will be less complex. The additional problems provided for MTH 511 students will require deeper understanding and more advanced reasoning.

Grade assignments for the class will be based on the following allocation.
Homework 150 points
Midterm 150 points
Final Exam 200 points
Total points possible: 500 points

Statement Regarding Students with Disabilities: Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details.

Link to Statement of Expectations for Student Conduct, i.e., cheating policies http://studentlife.oregonstate.edu/code