Math 442, Spring 2017

Instructor: Paul T. Allen

Basic logistics

- There is no required text. Students must take good notes in class!

- Additional materials will appear on the course website. Follow the link at:
  https://paultallen.wordpress.com/teaching/

Course goals

Students will learn

- basic concepts of point-set topology in the context of metric spaces,

- the basic structure of the metric space $C^0(X)$,

- one integral construction,

- the main theorems of differential calculus in $\mathbb{R}^n$,

- basic concepts in the differential topology of manifolds.

These goals will be assessed by evaluating student performance on quizzes and exams.

Plan for the course

The following tentative schedule is subject to change

Weeks 1 & 2 (18 − 27 January) metric spaces

Week 3 & 4 (30 January − 10 February) functions

Weeks 5 & 6 (13 − 24 February) calculus in $\mathbb{R}$

Week 7 (27 February − 3 March) flex week

Weeks 8 − 10 (6 − 24 March) calculus in $\mathbb{R}^n$

Weeks 11 − 14 (3 − 26 April) introduction to differential topology

Homework

- There is weekly homework.

- When submitting work, please make sure that

  - your name and the assignment number/name are clearly written at the top of the first page,
  - your work is neatly presented, and
  - all pages are stapled together.

Work that does not meet these standards are at risk of being placed in to one my "miscellaneous" folders, from which few documents ever return.

- In general, credit is not given for late or incomplete work. I may, at my discretion, accept late work and file it away; such work is considered only if your course grade is borderline.

Exams and quizzes

- There will be a take-home quiz at the end of the chapter on metric spaces.

- There will be a midterm exam at the end of the chapter on functions. The midterm has both an oral component and a take-home written component.

- There will be a take-home quiz after the chapter on calculus in $\mathbb{R}$.

- The final exam has both an oral component and a take-home written component.

Note: Per Lewis & Clark regulations, class will be held during the officially scheduled final exam time period. Attendance at this final class session is mandatory.

Course grades

- Course grades are to be a reflection of students' success in engaging with the course material, analyzing that material, and synthesizing the content in to a coherent framework that can be applied to subjects beyond the course.

- Course grades are computed as follows:

  1. A preliminary grade is computed by calculating a weighted average of all scores, according to the following weighting:
     - 40% Homework
     - 60% Quizzes and exams
  2. After computing the preliminary grade, I make adjustments based on inconsistent coursework (such as disregarding an outlier), trends throughout the semester (such as improvement), and other factors I deem relevant.
  3. Finally, I revisit the individual grades in view of the grade definitions provided by the College Catalog, seeking indicators of the synthesis of course material.

- I emphasize that ultimately grades are assigned according to the definitions in the college catalog, based on my assessment of the student's knowledge and synthesis of the course material, as documented by the assignments and exams. While a weighted average of individual scores is a critical tool for making this assessment, in no way is such an average definitive.

- Finally, I note that students fail the course if either of the following occurs:

  Insufficient participation Missing the equivalent of two weeks of class sessions, or missing one of the exams, will lead to a failing grade. Exceptions to this policy require documented extenuating circumstances.

  Gross negligence Demonstration of gross ignorance or complete lack of understanding of key concepts on exams will lead to a failing grade. In particular, a student who has accumulated what might be construed as 'technically enough points to pass' but demonstrates a "clearly inadequate" lack of understanding which is "unworthy of credit" will be awarded a failing grade.

4.0 scale

All coursework is graded on the 4.0 scale. The mapping between numerical and letter grades, together with definitions of letter grades, can be found below. That table also displays the official definitions from "Policies and Procedures" section of the Undergraduate Catalog, together with an interpretation for the purposes of a mathematics course (in italics).

Here are the official definition of grades, as they appear in the Lewis & Clark College Catalog, together with interpretation for the purpose of this course (in italics):

Grade A (4.0) Outstanding work that goes beyond analysis of course material to synthesize concepts in a valid and/or novel or creative way.

Computational problems are completely and correctly executed in a manner which displays a complete grasp of the theory behind the computation. Theoretical responses display a thorough understanding of the both precise details and the larger framework at hand.

Grade B (3.0) Very good to excellent work that analyzes material explored in class and is a reasonable attempt to synthesize material.

Computational problems are executed with minimal, insignificant errors (such as dropping a sign) and contain some indication that the relevant theory being used is understood. Theoretical responses display significant progress towards understanding of how the details fit in to a larger framework.

Grade C (2.0) Adequate work that satisfies the assignment, a limited analysis of material explored in class.

Solutions to computational problems display significant, though perhaps mechanical, understanding of basic procedures. Theoretical responses display an preliminary understanding of the topic at hand, but lack connections to the larger framework.

Grade D (1.0) Passing work that is minimally adequate, raising serious concern about readiness to continue in the field.

Both computational and theoretical responses display some non-trivial knowledge and skills, but raise concerns about whether basic ideas and methods are understood.

Grade F (0.0) Failing work that is clearly inadequate, unworthy of credit.

Fundamental misunderstandings, mis-use of methods or theory, seemingly random or un-related material, etc.