Math 404 (Introduction to) Topology

Fall 2016, UAF

Instructor: **Ed Bueler**
Office: Chapman 301C.
bueler.github.io/OffHrs.htm
Phone: 474-7693
eMail: elbueler@alaska.edu

Website: bueler.github.io/M404F16/
Times & Room: MWF 2:15--3:15 pm Chapman 106
CRN: 75528
Text: Sutherland, *Introduction to Metric & Topological Spaces*, 2nd ed., Oxford Univ. Press 2009

Course Content and Topics:

The course covers the definitions and constructions used in topology, starting from basic set theory. The fundamental concepts are open sets, continuity, compactness, and connectedness. Examples include metric spaces, product spaces, and quotient spaces.

Topology is both newer, as an essentially 20th-century theory, and more fundamental than geometry and analysis. In fact, the point-set topology in this course is the foundation of many other branches of mathematics, including real and complex analysis, differential geometry, algebraic and differential topology, manifolds, and even applied mathematics. The history of topology is a thread in the course, sewn-in when appropriate.

Goals and Outcomes:

Topology is central to mathematics and it is interesting in its own right. Learning something fundamental and interesting is thus the major goal.

Students taking this class should gain a better understanding of the mathematics they might teach in the future (e.g. at the calculus and pre-calculus level). Students going on to graduate-level mathematics will use this content directly in many advanced courses.

Assigned Work:

Weekly homework forms 50% of your score for the class. It is *essential* to your grade. It is equally essential to preparing for the exams. The homework consists of proofs, rigorously-justified examples and counter-examples, and occasional computations and actual sketches. Your homework, and the in-class exams, must include careful proofs using reasonable proof style.

Note that Math 265 Introduction to Mathematical Proofs is a prerequisite to this course! I will provide many examples of good proofs throughout the course, especially in the form of homework solutions but also in class.

Homework assignments, and their due dates, will be regularly posted at the Course Website bueler.github.io/M404F16/. The site also has a daily schedule of topics.

How Your Grade is Determined:

There will be **two in-class Midterm Exams** and an **in-class Final Exam**:

Work	**Percent of Grade**	**Dates**
Homework	50%	weekly
Midterm Exam I	14%	*in class*, Monday 3 October
Midterm Exam II	14%	*in class*, Monday 7 November
Final Exam	22%	*in class*, Wednesday 14 December, 1:00--3:00 pm

Based on your raw homework and exam scores, I guarantee grades according to the following schedule:

90 - 100 % = **A**, 79 - 89 % = **B**, 68 - 78 % = **C**, 57 - 67 % = **D**, 0 - 56 % = **F**.

This schedule is a guarantee. I reserve the right to increase your grade *above* this schedule based on the actual difficulty of the work and/or upon average class performance.

Policies:

The Dept of Mathematics and Statistics has reasonable policies on incompletes, late withdrawals, early final examinations, etc.; see www.uaf.edu/dms/policies. You are covered by the UAF Student Code of Conduct. I will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to student with disabilities.

Prerequisites:

Officially: *MATH F253 and MATH F265.*

The requirement that you have taken MATH 253 Calculus III is what math professors call a "mathematical maturity" requirement, but it is indeed appropriate that you have completed the calculus sequence. Additional 300- or 400-level MATH coursework will also help make this class easier. The requirement of MATH F265 Introduction to Mathematical Proofs is quite targeted: MATH 404 Topology is quite proof-intensive.