Course Description

Topologies are used to define continuous functions. This notion of continuity is quite general and extends the concept of continuity you have seen before for metric spaces. Although the definition of a topology is very simple, the framework it provides is surprisingly powerful. In particular, a topology describes a set's "shape", both locally and in terms of its global structure.

There are two distinct branches of topology: point-set topology and algebraic topology. This course will contain elements of both branches (with my bias as a differential geometer influencing the material). We will start with basic concepts from point-set topology and spend some time with example topological spaces. The point-set portion of the class will culminate in two deep theorems: Urysohn's Metrization Theorem which gives sufficient conditions for a topology to be derived from a metric, and Tychonoff's Theorem concerning the compactness of product spaces. The last third of the class will be devoted to elementary algebraic topology, a fascinating field that studies the relations between topological spaces and natural algebraic objects associated them. In this part of the class we will study homotopy theory, the fundamental group, covering spaces and the classification theorem of covering spaces.

Essential Information

Professor:	David Maxwell
Office:	Chapman 308C
Phone:	474-1196
Email:	`david.maxwell@uaf.edu`
Web:	`http://www.math.uaf.edu/~maxwell`
Required Text:	**Topology: a first course**, *James R. Munkres*, Prentice Hall
Recommended Text:	**Introduction to Topological Manifolds**, *John M. Lee*, Springer-Verlag
Optional Text:	**Algebraic Topology**, *Allen Hatcher*, Cambridge University Press (PDF available at `http://www.math.cornell.edu/~hatcher`)

Prerequisites

MATH F401-F402 (Advanced Calculus) **or** MATH F404 (Topology) **or** permission of instructor. It will be helpful if you have seen a bit of group theory before, but I will give a handout summarizing the basic group theoretic concepts and theorems.

Class Time

There will be three hours of class lecture each week. We will also have a one hour problem session on Tuesdays at a time yet to be determined. The problem sessions will be an opportunity for you to discuss with each other (with occasional guidance from me) the homework problems due that week.

Lecture Times
MWF   11:45–12:45 Chapman 107

Office Hours

I will schedule 3 hours a week of formal office hours on consultation with this class and will post the times on my website and outside my office door. I have an open door policy; if I'm in my office and my door is open, please feel free to drop by with questions. You are also welcome to schedule a meeting outside of my formal office hours by sending me an email.

Homework

There will be a homework assignment due roughly every week, usually on Wednesdays. Each week's assignment and due date will be announced in class and will be posted on my web page. I will also post solutions after each homework has been handed in.

Regarding late homework, I will accept from each student a single late homework with no questions asked. You must notify no later than the time the homework is due that you intend to take advantage of this opportunity, and you must hand in the homework no later than one week after it was due. Subsequent late homeworks will be accepted only under extenuating circumstances to be determined at my discretion.

On each homework assignment, I will typically stipulate that you must submit one of the problems (of my choice) typeset by LaTeX(or any other professional mathematics typesetting application).

Midterms

There will be one in-class midterm exam. It is tentatively scheduled to be held on Friday, March 9. Associated with this midterm, there will also be a take-home midterm to be handed out on Friday, March 2.

Final Exam

There will be a two-hour final exam on Friday, May 11. It will be held from 10:15am to 12:15pm at a location to be announced later. There will also be a take-home portion of the final exam to be handed out in the last week of class and due at 10:15 on May 11. Details on the take-home exam will be announced closer to the end of the semester.

Evaluation

Course grades will be determined as follows:

Homework	40%
Midterm	30%
Final	30%

Letter grades will be assigned according to the following scale. This scale is a guarantee; I also reserve the right to lower the thresholds.

A	90–100%
B	80–89%
C	70–79%
D	60–69%
F	0–59%

Schedule

A tentative schedule of readings and topics will be handed out on Friday, January 19.

Rules and Policies

Collaboration

You are encouraged to work together in solving homework problems. But each student must write up his or her own solutions independently. If you receive significant help solving a problem, it is customary to make a note in your homework to give the person who helped you credit.

Makeup Exams

You can make up an exam if certain extenuating circumstances prevent you from taking it and if you inform me in advance. Contact me as soon as possible if you are going to miss an exam.

Attendance

Attendance is not included directly as part of your grade.

Cell Phones

Turn off your cell phone before you come to class.

Disabilities Services

I will work with the Office of Disabilities Services (203 Whitaker, 474-7043) to provide reasonable accommodation to students with disabilities.

Incomplete Grade

Incomplete (I) will only be given in Computer Science, Mathematics or Statistics courses in cases where the student has completed the majority (normally all but the last three weeks) of a course with a grade of C or better, but for personal reasons beyond his/her control has been unable to complete the course during the regular term. Negligence or indifference are not acceptable reasons for the granting of an incomplete grade. (Note: this is essentially the old University policy.)

Late Withdrawals

A withdrawal after the university deadline from a Department of Mathematical Sciences course will

normally be granted only in cases where the student is performing satisfactorily (i.e., C or better) in a course, but has exceptional reasons, beyond his/her control, for being unable to complete the course. These exceptional reasons should be detailed in writing to the instructor, department head and dean.

Academic Dishonesty

Academic dishonesty, including cheating and plagiarism, will not be tolerated. It is a violation of the Student Code of Conduct and will be punished according to UAF procedures.