

Math 432, Topological Spaces
Course Syllabus
Spring 2016

Instructor and TA Contact Information

Instructor: Dr. Katie Walsh

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Office Hours: M 2-3 and Th 3-4 in Math 305

Friday 10-11 in Math 220

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General Information

Course Description: Set theory (countability/uncountability), topological spaces and continuous maps, metric spaces, connectedness and compactness, separability axioms and Hausdorff spaces, Tychonoff product theorem, introductory topics from algebraic topology (homotopy, fundamental group) or category theory.

Prerequisites: Math 323

Course Objectives:

1. Students will understand how to read definitions and abstract mathematics. Students will learn how to use definitions to write proofs.
2. Proofs are an integral part of this course and students are expected to be able to construct concise, rigorous, well-written proofs. Students should understand when a proof is required and when a counter-example is needed. Students will develop a sense as to how to go about solving problems.
3. Students should be able to work with the concepts of open, closed, continuity, and compact sets in the setting of an arbitrary topological space and understand how these ideas are interrelated.
4. Set theory is pervasive and students should leave the course with a thorough understanding of the language and notation of set theory.
5. Students will see an introduction to topics in algebraic topology to gain an insight into the depth on the field.

Required Textbooks and Materials:

Munkres **Topology** (2nd Edition). The economy edition is fine.

Recommended additional texts:

Dixmier **General Topology**

John B. Conway **A Course in Point Set Topology**.

Both recommended texts are available as free PDF downloads from the UA library.

Course website/D2L site: <http://d2l.arizona.edu> (for grades) and Piazza(for content and discussion)

Communication with Students

Announcements and important course information may be sent out via official University email or through D2L or Piazza. It is the student's responsibility to check for messages and announcements regularly.

Accessibility and Accommodations

It is the University's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Attendance/Administrative Drops

Daily attendance is expected from every student. Students who miss the first two class meetings will be administratively dropped unless they have made other arrangements. In addition, students with more than 3 unexcused absences might be administratively dropped from the course. (See Administrative Drop Policy at <http://catalog.arizona.edu/2015-16/policies/classatten.htm>) If you need to miss class for unavoidable circumstances, contact your instructor as soon as possible. Please note the following:

- All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion,
- Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

It is the student's responsibility to notify the instructor in advance of an absence related to religious observation or an activity for which a Dean's excuse has been granted, and to arrange for how any missed work will be handled.

Academic Integrity

Students are responsible to inform themselves of University policies regarding the Code of Academic Integrity. Students found to be in violation of the Code are subject to penalties ranging from a loss of credit for work involved to a grade of E in the course, and risk possible suspension or probation. The Code of Academic Integrity will be enforced in all areas of the course, including, but not limited to, homework, quizzes, and tests. For more information about the Code of Academic Integrity policies and procedures, including information about your rights and responsibilities as a student, see the following website: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>

Student Code of Conduct

Students at The University of Arizona are expected to conform to the standards of conduct established in the Student Code of Conduct. Prohibited conduct includes:

1. All forms of student academic dishonesty, including cheating, fabrication, facilitating academic dishonesty, and plagiarism.
2. Interfering with University or University-sponsored activities, including but not limited to

classroom related activities, studying, teaching, research, intellectual or creative endeavor, administration, service or the provision of communication, computing or emergency services.

3. Endangering, threatening, or causing physical harm to any member of the University community or to oneself or causing reasonable apprehension of such harm.

4. Engaging in harassment or unlawful discriminatory activities on the basis of age, ethnicity, gender, handicapping condition, national origin, race, religion, sexual orientation, or veteran status, or violating University rules governing harassment or discrimination.

Students found to be in violation of the Student Code of Conduct are subject to disciplinary action. For more information about the Student Code of Conduct, including a complete list of prohibited conduct, see the following website: <http://deanofstudents.arizona.edu/accountability/students/student-accountability>

Other Relevant University Policies Relating to Conduct

Please take note of the following University policies:

- Policy on Threatening Behavior by Students: <http://policy.web.arizona.edu/education-and-student-affairs/threatening-behavior-students>

- Nondiscrimination and Anti-Harassment Policy: <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Expected Classroom Behavior

Students should turn off all electronic devices during class unless the device is deemed necessary for the class by the instructor. This includes, but is not limited to cell phones, mp3 players, and laptops. If you have a disability-related accommodation that involves the use of a computer during class, please discuss this with your instructor in advance.

Policies for Graduate Students

Graduate students enrolled in Math 532 will have additional homework and exam questions they are required to answer and will be graded on a different grading scale ("curve") than undergraduate students.

Homework & Quiz and Presentation Policies

There will be 8 homework assignments and 7 quizzes and 2 presentations(per student). Homework is due Wednesday in class. Quizzes will be on Fridays. They are both approximately every other week. There will be one student presenting each class period. Dates and names are on the Google calendar for the class.

Homework must be typed or neatly handwritten. Problems should be done in the order that they are assigned. All solutions must be written in complete sentences with a proper amount of details shown. Students are encouraged to discuss homework questions with their classmates but solutions should be written independently. Each homework will be graded for correctness, neatness and completeness out of 20 points. Late homework submitted after class (9:50am) on Wednesday until after class on Friday (9:50am) will be accepted with a penalty of 5 points. No other late homework will be accepted. During exam weeks, (HW 2, 4 and 7) solutions to homework will be posted immediately following class on Wednesday and therefore late homework will not be accepted those weeks. One homework will be dropped. Homework will be worth $7 \times 20 = 140$ points (20% of your final grade).

There will be 7 in class quizzes. Quizzes will be out of 5 points each. The lowest quiz will be dropped. No make-up quizzes will be given, except in the case of excused absences in which case you must contact me no later than 24 hours after the quiz to make arrangements for a makeup. Quizzes will be worth $6 \times 5 = 30$ points.

Each student is assigned two days in class to give a presentation. Presentations will be at the beginning of class and can last no more than 5 minutes. You may choose a problem to present. It can either be from the most recent homework that was turned in or from the corresponding section in the book. You may not present a problem another student has already presented. If you have another problem you'd like to present, you must get it approved in advance. You must turn in a well written solution to the problem and present the solution to the class. The written portion is worth 5 points, the correctness of the solution presented is worth 5 points and the presentation itself is worth 5 points. For more information, see the presentation guidelines. In total, your two presentations will be worth 30 points towards your final grade.

Midterm Exams

There will be three midterm exams. The first and the third are Mini Exams. They will only have an in class portion. They are worth 80 points each. They are Feb 5 and April 15.

The second exam will have both an 80 point in class portion and a 60 point take home portion. The in class portion is March 4. The take home portion will be distributed on March 4 and is due in class on Wednesday, March 9. It is worth 60 points. Any take home turned in after 9:50am on March 9 will automatically lose 10 points. No take homes will be accepted after 9:50am on Friday, March 11.

Makeup Exams will only be given in extenuating circumstances at the discretion of the instructor. If you miss an exam, you must contact the instructor via e-mail within 48 hours to discuss the possibility of a make-up. Make-ups will automatically be penalized 10% of the earned grade. If you are late to an exam, you will be allowed the entire 50 minutes, but extra time will also be penalized at the prorated rate and must be immediately following class.

Any academic integrity violation related to an exam will result in a grade of 0 on that exam and a referral to the disciplinary board.

Final Exam

The final exam is Thursday May 12 at 10:30am in our regular classroom.

Please note the following:

- University rules relating to final examinations may be found at: <http://www.registrar.arizona.edu/schedule101/exams/examrules.htm>
- The University final exam schedule may be found at: <http://www.registrar.arizona.edu/schedules/finals.htm>

Missed Exam Policy

Students who are unable to attend an exam should notify their instructor as soon as possible. Arrangements for a make-up test will be considered on a case by case basis. Make-up exams will be administered only at the discretion of the instructor and will be penalized 10% of the earned grade. If a student is allowed to make up a missed exam, (s)he must take it at a mutually arranged time. No further opportunities will be extended. Failure to contact the instructor as stated above (via e-mail within 48 hours) will result in a grade of zero on the exam.

Calculation of Course Grades

The various components of the course grade will be weighted as follows:

Midterm Exam: $3 \times 80 + 60 = 300$ pts

Homework/Quizzes/Presentations: $140 + 30 + 30 = 200$ pts

Final Exam: 200pts

Course grades will be calculated based on the following scale:

90-100% A, 80-89% B, 70-79% C, 60-69% D, Below 60% E

Grades may be curved, but only to lower grade cutoffs, not raise them. (e.g. an 90% will always be an A, but depending on class averages an 88% might also be an A).

A grade of "I" (Incomplete) will be given only at the instructor's discretion, according to University Policy as described at <http://www.registrar.arizona.edu/gradepolicy/incomplete.htm>.

Grading Disputes

Any grading disputes must be addressed within one week after an exam or homework has been returned.

Withdrawal

A student may withdraw from the course with a deletion from record through Jan 27, 2016, using UAccess. A student may withdraw with a grade of "W" through March 29, 2016, using UAccess.

Changes to the Course Syllabus

The information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Tentative Weekly Schedule A weekly schedule is available on the Google Calendar for this class which is posted on Piazza.