Math 470   Topology   Fall 2014

Class Meetings: MWF 10:20-11:20, Ford 301

Professor: Inga Johnson, Ford 212, ijohnson@willamette.edu, 503.370.6551

Course website: on WISE, http://wise.willamette.edu/

Course Goals:
- To learn introductory content of geometric, algebraic and point set topology: topological equivalence & invariants, knots & knot polynomials, classification of surfaces, Euler characteristic, the fundamental group, connectedness, and compactness.
- To practice and develop proof writing skills.
- To increase ability to communicate mathematics verbally and in writing.

Textbook: *Topology NOW!* by Robert Messer & Philip Straffin.
textbook website: http://people.albion.edu/ram/topologynow!/

Course components and grades:

Weekly Homework:	30%
Midterm Exams:	20% each
Participation, Quizzes, Worksheets, Math Colloquiua	5%
Final Exam:	25%

Your grade will be based on the percentage of points you earn out of the total possible. 90% and above guarantees an A-, 80% and above guarantees a B-, 70% and above guarantees you a C-, and 60% and above guarantees a D.

Homework: The homework for this course will be **due in class on Friday.** The weekly homework assignments will be posted on the course website. Your homework must be typed using LaTeX. You may include figures in your homework by hand (leave space and draw them after printing) or by including the images into your LaTeX file.

Late Homework policy: You may turn in ONE homework assignment late (within one week of when it was due) with no penalty and no questions asked. All late homework assignments should be clearly labeled with the phrase "Late Math 470 HW" at the top of the first page. Any late assignment turned in without this phrase might be lost, or confused with garbage and accidentally thrown out. Any additional late homework assignments will be accepted and graded at my discretion.

Midterm Exams, and Final Exam: There will be two midterm exams and a comprehensive final exam. These exams will be taken individually to test your concept understanding and proof writing abilities over the topics covered thus far in the course.

Participation, Quizzes, Worksheets & Math Colloquiua:
You are expected to actively participate in class by asking questions and contributing to discussions. Prior to each class meeting, you will be expected to read the sections of the textbook scheduled for that day. From this first read of the textbook you should arrive in class with some understanding (though not a perfect understanding) of material. In

particular, you should bring to each class meeting a hand-written page of notes including (1) a precise statement of all definitions from that section of the textbook and (2) your work towards investigating examples (and non-examples) of these definitions. Our work in-class will be to address confusion, investigate concepts more deeply, and delve into the details and proofs.

If it is clear to me that students are spending time with the definitions and basic ideas from the textbook prior to class, then there will be no need for quizzes. Else, I will give pop-quizzes on statements of definitions and theorems at the beginning of class.

You are encouraged to go to the Math Department Colloquia this semester, and as part of the course you are **required to go to four**. Attendance will be taken in Colloquium. If your schedule conflicts with all the colloquia, please see me for an alternate reading and writing assignment.

Special Note: If you have a documented disability and anticipate needing accommodations in this course, please make arrangements to meet with me within the first two weeks of the semester. Please request that a Disability Services staff person send me the appropriate forms verifying your disability and specifying the accommodation you will need. If your disability allows for extra time on an exam you **must remind me of your needs at least one week before the exam and send me an email reminder at least three days before the exam to ensure appropriate accommodations have been made.**

Academic Honesty: As is stated in the Willamette University CLA catalog "Plagiarism and cheating are offenses against the integrity of the courses in which they occur and against the college community as a whole. Plagiarism and cheating involve intellectual dishonesty, deception and fraud, which inhibit the honest exchange of ideas. In accordance with Willamette University Standards of Conduct and the Willamette Ethic, students are entitled to notice of what constitutes plagiarism and cheating, and the right to appeal penalties. Plagiarism and cheating may be grounds for dismissal from the college." Additional information can be found on the Plagiarism and Cheating Policy website http://www.willamette.edu/cla/catalog/resources/policies/

A note on homework: It is appropriate and very helpful to have study groups for homework. Sharing ideas and approaches is an excellent way to learn. However, all students must write up their own solutions individually. **Copied homework will earn a grade of zero for all parties involved**. It is advisable that you do not make your written work available to other students. I will spend no time attempting to determine who copied from whom.

Expectations Outside of Class:
Willamette's Credit Hour Policy holds that for every hour of class time there is an expectation of 2-3 hours work outside of class. Thus, for our class meeting three days a week you should anticipate spending 8-9 hours outside of class engaged in study time, reading and homework assignments, research projects, and group work.

Religious Observances:
Willamette University recognizes the value of religious practice and strives to accommodate students' commitment to their religious traditions whenever possible. When conflicts between holy days or other religious practice and academic scheduling arise, every effort should be made to allow students to adhere to their tradition, including, when possible, excusing class absences and allowing make-up work. A student anticipating the need to miss a class for religious reasons should alert the faculty member within the first two weeks of the semester, and the two of them should determine the next course of action. Any unresolved difficulty should be referred to the Office of the Chaplains.

Important Dates:
Last day to file Add/Drop, September 9
Last day to choose Credit/No Credit, October 7
Last day to Withdraw, October 31
Final exam for Math 470, Monday, Dec 8, 8-11am

Tentative Schedule:

Week 1: Chapter 1, Sections 1.1, 1.2, 1.3 (Equivalence, Bijections, Continuous Functions)
Week 2: Chapter 1, Sections 1.3, 1.4 (Continuous Functions, Topological Equivalence)
Week 3: Chapter 1, Section 1.5, 1.6 (Topological Invariants, Ambient Isotopy), Chapter 2, Section 2.1 (Knots, Links and Equivalence)
Week 4: Chapter 2, Sections 2.2, 2.3, 2.4 (Knot Diagrams, Reidemeister Moves)
Week 5: Chapter 2, Sections 2.4, 2.5 (Colorings, Alexander Polynomial)
Week 6: Chapter 2, Sections 2.6, 2.7 (Skein Relations, Jones Polynomial)
Week 7: Chapter 2, Section 2.7 (Jones Polynomial), Review, **EXAM 1, Oct. 8,** Section 3.1 (Surfaces)
Week 8: Chapter 3, Sections 3.2, 3.3 (Cut and Paste, Euler Characteristic), Midsemester Day, Friday Oct 17
Week 9: Chapter 3, Sections 3.4 (Classification of Surfaces)
Week 10: Chapter 4, Sections 4.1, 4.2, 4.3 (3D Manifolds, Shape of Space, Euler Characteristic, Glueing Polyhedra Solids)
Week 11: Chapter 6, Sections 6.1, 6.2, 6.3 (Deformations with Singularities, Invariance of Fundamental Group)
Week 12: Chapter 6, Sections 6.4, 6.5 (The Sphere and the Circle), Review
Week 13: EXAM 2, Nov. 17, Chapter 7, Sections 7.1, 7.2 (Metric & Topological Spaces),
Week 14: Chapter 7, Sections 7.3, 7.4 (Connectedness, Compactness)
Thanksgiving Break, Nov 27-28
Week 15: Chapter 7, Section 7.5 (Quotient Spaces), Review

FINAL EXAM: Monday, Dec. 8, 8-11 am