Topology (Math 421) – Fall 2015

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Class Time and Location: MWF 10:30 – 11:20 in Keller 402.
OFFICE HOURS: MWRF 9:30 – 10:30 and by appointment

TEXT & MATERIAL: Topology by James R. Munkres will be fine. A .pdf (free) is online. There are other good texts, like General Topology by Stephen Willard, reprinted by Dover, Topology by Hocking and Young, Dover, Topology by Jänich, UTM Springer, Topologie by Grothemeyer (in German), General Topology I, II, by N. Bourbaki (all you ever wanted to know, and more, and probably available in French), . . .

Topics (roughly Sections 12–37 and 51–78 in Munkres):

• Topological Spaces and Continuity (definition of a topology, basis and subbasis of a topology, metric topologies, subspace topology, product topology, quotient topology, . . .)

• Connectedness and Compactness

• Countability and Separation Axioms

• Tychonoff Theorem

• Metrization Theorems

• Fundamental Group (Homotopy of paths, fundamental group, covering spaces, fundamental group of the circle, Borsuk–Ulam Theorem, Deformation retracts and homotopy type, fundamental group of some surfaces.)

• Jordan curve theorem and Invariance of Domain.

Student Learning Outcomes: Upon successful completion of Math 421, the student will have a basic understanding of and will be able to use the key concepts from general topology, the idea of a topology, functorial constructions based on topologies, separation axioms, and metrization. Students will also learn how to use discrete invariants to characterize geometric objects.
Program objectives: Students should gain a basic understanding of the key concepts from general topology that are foundational to many areas in mathematics. Students should develop an appreciation for how discrete invariants, such as the Euler characteristic and fundamental group, are used in the classification of geometric objects, such as surfaces.

EXAMS: There will be two midterms (the dates will be announced in class) and a final exam (see the university calendar for the date and time). Make-up exams will be given only under excruciating circumstances such as serious illness or family emergencies. Proof may be required. If you are a student athlete, or you need to travel for academic reasons, then you must make arrangements in advance to take tests at an alternate time, possibly early.

HOMEWORK: We will assign homework every lecture. It is due during the next lecture. Homework should be cleanly written, and you may have to revise it before it is in an acceptable form. Your solutions should show the steps of your solution in a logical order and end with a proper formulation of the final answer. Students are encouraged to collaborate on homework, but final write-ups must be done individually.

GRADING: Your grade will be determined by the number of points earned throughout the semester. Each midterm is worth 100 points and the final 150 points. The maximal number of points you can earn on homework is 150 points. Cut-offs for letter grades will be decided at a later time. Throughout the semester you may ask me what your approximate standing is.

ABSENSES: It is expected that you attend every class. If you are absent, then you are responsible for the material covered. Arrange to copy another student’s notes and be informed of any announcements.

ACADEMIC EXPECTATIONS: Please read the statement about the academic expectations on the Mathematics Department webpage. Go to http://www.math.hawaii.edu, pick ‘Undergraduate’ and click on Academic Expectations.

ACADEMIC HONESTY: No student shall claim or submit the work of another as one’s own. No dishonesty will be tolerated.

IMPORTANT DATES: It is your responsibility to know about the important dates, such as deadlines to drop or withdraw from a course, holidays, final exam, etc.