MTG 5417/4303 Introduction to Topology (6171/4623)(18496/18468)
Spring 2019
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http://people.clas.ufl.edu/kees/files/MTG5317Spr2019.2.jpeg
http://people.clas.ufl.edu/kees/files/MTG5317Spr2019.3.jpeg
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Instructor: James Keesling, Professor of Mathematics
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Office Hours: MW 4th Period

Meeting Time and Place: MWF 6th Period, 12:50-1:40 pm
LIT 127

Textbook: Not required, James Munkres, *Topology* (2nd Edition), (2000).

Goal: The student should become familiar with the techniques of topology and their relationship and application to analysis, geometry, and other areas of mathematics.

Syllabus: This course is a continuation of MTG 5316 will cover the basic concepts and examples in topology. The purpose of the course is to demonstrate the use of topology in analysis and geometry. The important concepts of topology are the following: open and closed sets, open covers, separation axioms, functions and continuity, homotopy, homeomorphism, compactness, partitions of unity, product spaces, metric spaces, convergence, completion, quotient spaces, inverse limits, and the fundamental group.

Important examples of topological spaces include Euclidean space $\mathbb{R}^n$, the interval [0,1], the Cantor set *C*, the *n*–cube $[0,1]^n$, the circle $\mathbb{S}^1$, the *n*–sphere $\mathbb{S}^n$, the *n*–torus $\mathbb{T}^n$, 1-dimensional graphs, and 2-dimensional surfaces. We will show how to use these spaces to build other spaces by various constructions including free unions, quotient spaces, mapping tori, nested intersections, and inverse limits. Among these constructions will be CW-complexes, solenoids, and the pseudoarc. Important theorems to be covered are the Hahn-Mazurkiewicz theorem, the arc-wise connectedness theorem, the Jordan theorem, the Banach fixed point theorem, and the Brouwer fixed point theorem.

Week 1-3	The Hahn-Mazurkiewicz Theorem, and the arcwise connectedness theorem
Week 4	Homotopy
Week 5	The Fundamental Group
Week 6	Separation theorems in the plane, the Brouwer fixed point theorem
Week 7-8	The Seifert-van Kampen Theorem
Week 9-10	Classification of surfaces
Week 11-12	Classification of covering spaces
Week 13	Applications to group theory
Week 14-16	Topological groups, solenoids, Antoine's necklace, Alexander horned sphere

Tests: There will be two in-class tests and a final exam.

Final Exam Time and Room: Monday, April 29, 10 am to 12 noon, LIT 127

Policy for Make-Up Exams: If a student has a known conflict for an exam, the student has the responsibility to make arrangements for a make-up before the exam is given. If a student misses an exam due to an emergency, arrangements must be made as soon as possible for a make-up.

Students with Disabilities: Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.