Math 5723	**Differential Topology I**	Fall 2021
Section: 001	MWF 10:45 – 11:35	Prof. Matthew Clay
	PHYS 132	

Office: SCEN 326 **Email**: mattclay@uark.edu **Phone**: 575–5195

Office Hours: All office hours will be held via Zoom (link available on Blackboard).

Monday: 1:00 – 2:00, Tuesday: 11:30 – 12:30 and Friday: 2:00 – 3:00

If you are unable to use any of the above times, please make an appointment.

Texts:

- *A Comprehensive Introduction to Differential Geometry I* by Michael Spivak (3rd ed) PRIMARY/REQUIRED
- *An Introduction to Manifolds*, by Loring W. Tu RECOMMENDED
- *Topology from the Differentiable Viewpoint*, by John W. Milnor RECOMMENDED
- *Differential Topology* by Victor Guillemin and Alan Pollack RECOMMENDED

Prerequisites: MATH 4513 and graduate standing in mathematics or statistics, or departmental consent.

Learning Objectives:

- Gain a familiarity with the methods of differential topology
- Understand how calculus on Euclidean space generalizes to calculus on manifolds
- Apply topological invariants to prove important topological theorems
- Perform calculations with differential forms and vector fields

Topics:

- Smooth manifolds: definitions, examples, tangent planes, tangent bundles, orientations
- Smooth functions: derivatives, regular values, submersions, immersions, Sard's theorem
- Vector fields: integral curves, Lie bracket
- Integral submanifolds: Frobenius integrability theorem
- Integration: exterior algebra, differential forms, closed and exact forms, Stokes theorem, de Rham cohomology

Academic Honesty Policy: As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail. Each University of Arkansas student is required to be familiar with and abide by the University's "Academic Integrity Policy" which may be found at `http://honesty.uark.edu`. Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.

Homework: Homework is assigned and collected weekly. Problems will be posted on Blackboard. Solutions are to be prepared using LaTeX and must be submitted via Gradescope. A template for homework submissions will be provided. Every third Friday, we will have student presentations of selected homework exercises.

Course Grade:

- Participation - 5%
- Homework - 40%
- Homework Presentations - 10%
- Midterm Exam (Monday, October 11) - 20%
- Final Exam (Wednesday, December 15, 10:15 AM – 12:15 PM) - 25%

Letter grades: $A : 100 - 90$; $B : 89 - 80$; $C : 79 - 70$; $D : 69 - 60$; $F : 59 - 0$

All scores posted on or before Dead Day will be deemed accurate unless a possible error is brought to the attention of the instructor before the scheduled final exam.

Important Dates

Monday, August 23	Classes Start
Friday, September 3	Last day to drop without W
Monday, September 6	Labor Day
Monday, October 11	Midterm Exam (20% of grade)
Monday, October 25 – Tuesday, October 26	Fall Break
Friday, November 19	Last day to drop with W
Wednesday, November 24 – Friday, November 26	Thanksgiving Holiday
Thursday, December 9	Last day of classes
Wednesday, December 15	Final Exam (10:15 AM – 12:15 PM) (30% of grade)

See `http://registrar.uark.edu` *for the complete academic calendar and final exam schedule.*

Special Accommodation: Students who are registered with the Center for Educational Access must notify the instructor in writing by the end of the first week of class, or within one week of registering with CEA.

Disclaimer: Information on this syllabus is subject to change. Any change will be announced on Blackboard and during the regular metting time.