SYLLABUS – MAT 531
TOPOLOGY-GEOMETRY II, Spring 2021
Online Tues. and Thurs. 3:00 – 4:20

This course is an introduction to the basic theory of smooth manifolds. Topics to be covered include: smooth manifolds and mappings, tangent and tensor bundles, vector and tensor fields, flows and the Lie derivative, differential forms, integration on manifolds, Stokes theorem, deRham cohomology, and the Frobenius theorem.

INSTRUCTOR: Blaine Lawson

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Office Hours: Tu.-Thu. 1:00–2:30 or make an arrangement for a personal Zoom meeting. The best way to contact me is by e-mail, which I read all the time.

GRADER: Aleksandar Milivojevic

Office: 3-104 Math Tower

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TECHNICAL REQUIREMENTS: This course will be entirely online. Classes will be setup on Zoom. It will be necessary to have a computer and access to Zoom.

HOMEWORK: There will be weekly homework assignments, generally due in class on **Mondays**. Check the course schedule below regularly for the assignments.

TEXT: *Introduction to Smooth Manifolds*, 2nd Edition, by John M. Lee, Springer Verlag 2012

GRADING: Homework 50%, Midterm 20%, Final 30%

COURSE OUTLINE

Week 1: Background review: Ordinary Differential equations, the Implicit Function Theorem. Appendices C and D. Smooth manifolds and maps. Chapters 1 and 2.
Week 2: Tangent vectors and derivatives of mappings. Chapter 3.
Week 3: Submersions, immersions, submanifolds. Chapters 4 and 5.
Week 4: Sard's Theorem, transversality. Chapter 6.
Week 5: Vector fields and flows. Chapters 8 and 9.
Week 6: Vector bundles. Chapter 11. Review.
Week 7: Midterm Exam. Tensors. Chapters 11 and 12.
Week 8: Tensors and differential forms. Chapters 12 and 14.
Week 9: Differential forms and orientation Chapters 14 and 15.
Week 10: Forms and integration. Chapters 15 and 16.
Week 11: Integration of forms, Stokes' Theorem. Chapters 16 and 17.
Week 12: De Rham Cohomology. Chapter 17.
Week 13: Foliations and the Frobenius Theorem. Chapter 19.

Final Exam: Tuesday, May 11, 2:15 pm-5:00 pm.

Disability Support Services: If you have a physical, psychological, medical, or learning disability that may affect your course work, please contact Disability Support Services (DSS) office: ECC (Educational Communications Center) Building, room 128, telephone (631) 632-6748/TDD. DSS will determine with you what accommodations are necessary and appropriate. Arrangements should be made early in the semester (before the first exam) so that your needs can be accommodated. All information and documentation of disability is confidential. Students requiring emergency evacuation are encouraged to discuss their needs with their professors and DSS. For procedures and information, go to the following web site http://www.ehs.sunysb.edu and search Fire safety and Evacuation and Disabilities.

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instance of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/.

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, and/or inhibits students' ability to learn.