

## PMATH 465/665 Geometry of Manifolds, Fall 2019

Lectures: MWF 9:30-10:20 in MC 4045.

Instructor: Stephen New, office MC 5419, extension 35554, office hours TBA.

Text: Introduction to Smooth Manifolds, by John M. Lee.

Course Outline: We will cover much of the following material from the textbook.

- Appendix A: Review of Topology
- Chapter 1: Smooth Manifolds
- Chapter 2: Smooth Maps
- Chapter 3: Tangent Vectors
- Chapter 4: Submersions, Immersions and Embeddings
- Chapter 5: Submanifolds
- Chapter 7: Lie Groups
- Chapter 8: Vector Fields
- Chapter 9: Integral Curves and Flows
- Chapter 10: Vector Bundles
- Chapter 11: The Cotangent Bundle
- Chapter 12: Tensors
- Chapter 14: Differential Forms
- Chapter 15: Orientation
- Chapter 16: Integration on Manifolds
- Chapter 17: DeRham Cohomology
- Chapter 19: Distributions and Foliations

Assignments: There will be about 5 assignments, to be handed in during class.

No late assignments will be accepted. The lowest assignment mark will not be counted.

Any assignments which remain uncollected by the end of January, 2020 will be shredded.

Tests: There will be a 1.5 hour midterm test and a 2.5 hour final exam (which will cover all of the course material). Calculators will not be allowed on tests.

Course Mark: The final course grade  $G$  will be given by the maximum of the two marking schemes

$$G = 20\%A + 30\%M + 50\%E \qquad G = 10\%A + 15\%M + 75\%E$$

where  $A$  is at the average of the assignment marks,  $M$  is the mark on the midterm test, and  $E$  is the mark on the exam. Graduate students will be required to do an additional project which will also contribute to the grade.

Website: The course website can be found at <http://www.math.uwaterloo.ca/~snew/>

**Persons with Disabilities:** Access Ability Services located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the Access Ability Services at the beginning of each academic term.

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**Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

**Discipline:** A student is expected to know what constitutes academic integrity to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>. For typical penalties check Guidelines for the Assessment of Penalties, <http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm>.

**Appeals:** A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>.