University of Toronto at Scarborough Department of Computer and Mathematical Sciences

MAT D67W

2020/21

Differentiable Manifolds

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Lecture Time: T 2-3, Thurs 1-3

Textbooks:

Required text: Loring Tu, An Introduction to Manifolds, Springer Universitext (available online), 2010.

Web: http://www.math.toronto.edu/~jeffrey Office hours: Monday 11-1 (on Zoom) or by appointment Both lectures and office hours are on Zoom. Syllabus:

- 1. Assignment 1, due Jan 28 2021:
 - (a) Definition of smooth manifolds
 - (b) Maps between smooth manifolds (Tu chap. 5,6)
- 2. Assignment 2, due Feb 11 2021:
 - (a) Tangent spaces (Tu chap. 8)
 - (b) Submanifolds (Tu chap. 9)
- 3. Assignment 3, due March 11, 2021:
 - (a) Rank (Tu chap. 11)

- (b) Tangent bundle (Tu chap. 12)
- (c) Bump functions (Tu chap. 13)
- (d) Vector fields (Tu chap. 14)
- 4. Assignment 4, due Thurs March 25, 2021: Differential forms (Tu chaps. 17, 18, 19)
- 5. Assignment 5, due Thurs April 8, 2021: Integration and Stokes' theorem (Tu chaps. 21, 22,23)

Marking scheme:

5 Assignments 75 %

Written report or oral presentation on a topic chosen from a list of suggestions, 25 % Although you may work together and ask questions about the assignments, the work you hand in must be written up in your own words.