

**SF3674 DIFFERENTIAL GEOMETRY,
GRADUATE COURSE, FALL 2016,
READING INSTRUCTIONS AND EXERCISES**

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LECTURE 7, TUESDAY OCTOBER 18

Reading instructions. The purpose of this lecture was to demonstrate that

- simply connected and geodesically complete Riemannian manifolds with negative sectional curvature are diffeomorphic to \mathbb{R}^n ,
- connected and geodesically complete Riemannian manifolds with a strictly positive lower bound on the Ricci curvature are compact and have a finite fundamental group.

The material for the lecture is pp. 126–140, Chapter 5 of O’Neill’s book [1] (until but not including “Lorentz causal character”), as well as pp. 263–280, Chapter 10 of O’Neill’s book [1] (until but not including “The endmanifold case”).

Exercises.

- (1) O’Neill [1] problems 5.1, 5.12, 10.1a and 10.5.

REFERENCES

- [1] Barrett O’Neill. *Semi-Riemannian geometry*, volume 103 of *Pure and Applied Mathematics*. Academic Press, Inc. [Harcourt Brace Jovanovich, Publishers], New York, 1983. With applications to relativity.