

Mathematics 502,
Theory of Functions of a real variable II
H. J. Sussmann

**Tentative Syllabus for the second half of the
Spring 2020 semester**

*The lectures will follow the book “Real Analysis”, by
G. Folland*

Lecture 1, Tuesday March 24. Radon measures. The dual of the space $C_0^0(X)$ for a locally compact Hausdorff space X . (Folland, Chapter 7.)

Lecture 2, Thursday March 26. Review of Hilbert spaces, orthonormal bases, and the projection theorem. (Folland, section 5.5)

Lecture 3, Tuesday March 31. Fourier series and Fourier transforms. (Folland, sections 8.1, 8.2, 8.3.)

Lecture 4, Thursday April 2. Summation of Fourier integrals and series. (Folland, section 8.4.)

Lecture 5, Tuesday April 7. Pointwise convergence of Fourier series. (Folland, section 8.5.)

Lecture 6, Thursday April 9. Fourier analysis of measures. Bochner’s theorem. (Folland, section 8.6.)

Lecture 7, Tuesday April 14. Applications of Fourier series and Fourier transforms to partial differential equations. (Folland, section 8.7.)

Lecture 8, Thursday April 16. Review of point-set topology, compactness theorems, topological vector spaces. (Folland, sections 4.5 and 5.4.)

Lecture 9, Tuesday April 21. Introduction to distribution theory. (Folland, sections 9.1, 9.2.)

Lecture 10, Thursday April 23 Sobolev spaces. (Folland, section 9.3.)

Lecture 11, Tuesday April 28. Haar measure on locally compact groups. (Folland, section 11.1.)

Lecture 12, Thursday April 30.) Hausdorff measure and Hausdorff dimension. (Folland, sections 11.2 and 11.3.)