Special Topics: Spectral Theory

Course contents:

- Theory of Distributions, in particular the spaces $\mathcal{D}$, $\mathcal{D}'$, $\mathcal{S}$, $\mathcal{S}'$
- Fourier transform of distributions and $L^p$-spaces, convolution
- Sobolev spaces, imbedding theorems
- Applications to Operator and Spectral Theory: Differential operators with constant coefficients, relatively bounded and relatively compact perturbations, Schrödinger operators and their spectra

Text: For the first part of the course on Distribution Theory I plan to mostly follow Chapters 5 to 9 of V. S. Vladimirov “Equations of Mathematical Physics”. I will provide copies of these chapters. For the later spectral and operator theoretic topics I will use other sources which may include the book by J. Weidmann “Linear Operators in Hilbert Spaces” and the first two volumes of M. Reed and B. Simon “Methods of Modern Mathematical Physics”.

Necessary background: Passing of the Joint Program Exam or permission by instructor.

Grading policy: Students who take the course for three credit hours will be expected to do approximately three hours worth of presentations. Materials for these presentations will be provided.

Occasional homework will be assigned, generally consisting of working out details of material covered in class.

Regular attendance is expected.