Notes on Midterm 2

Midterm 2 covers sections 9.3, 9.4, 9.5, 11.1, 11.2, 11.3, 11.4.

Section 9.3: Everything is included.

Section 9.4: Theorem 9.17 is important. You should understand the material on Hilbert-Schmidt operators, but the only result that I would recommend that you memorize is that if $k \in L^2(\Omega \times \Omega)$, then the operator $[K\,u](x) = \int_\Omega k(x,y)\,dy$ is compact.

Section 9.5: Everything is included.

Section 11.1: The construction of the topology on $\mathcal{S}$ is interesting, but the only fact you absolutely need to know is that a sequence $(\varphi_n)_{n=1}^\infty$ in $\mathcal{S}$ converges if and only if $||\varphi - \varphi_n||_{\alpha,k} \to 0$ as $n \to \infty$ for every α and every k.

Section 11.2: Everything is included. The condition on when a functional T on $\mathcal{S}$ is continuous that is given right before Example 11.5 is very important.

Section 11.3: Everything is included.

Section 11.4: Everything except Proposition 11.22.