For elliptic curves, the modular polynomial $\Phi_p(X, Y)$ parametrizes elliptic curves together with a $p$-isogeny. The polynomial $\Phi_p(X, X)$ parametrizes elliptic curves together with an endomorphism of degree $p$. Kronecker discovered already that the irreducible factors of $\Phi_p(X, X)$ are Hilbert class polynomials. In this talk we will consider abelian surfaces with extra endomorphisms. We will show which factors occur when you factor the 2-dimensional analogue of the modular polynomial $\Phi_p(X, X)$. In the case $p = 2$, everything can be explicitly computed and we will give a complete classification of abelian surfaces admitting a $(2, 2)$-endomorphism. (Received September 14, 2011)