The module of vector-valued modular forms on $SL(2, \mathbb{Z})$. Preliminary report.

For an arbitrary finite-dimensional complex representation $\rho : SL(2, \mathbb{Z}) \to GL(p, \mathbb{C})$ of the modular group, let $F(\rho)$ and $H(\rho)$ be the corresponding $\mathbb{Z}$-graded spaces of holomorphic and almost holomorphic vector-valued modular forms respectively on $SL(2, \mathbb{Z})$. We will discuss the functorial nature of the associations $\rho \mapsto F(\rho)$ and $\rho \mapsto H(\rho)$, and explain that $H(\rho)$ is a Noetherian module over the ring of classical modular forms. Time permitting, we discuss connections with differential operators and present some illustrative examples. (Received July 25, 2007)