Proof: We take a fixed ordered basis $\alpha = \{\bar{v}_1, \dots, \bar{v}_n\}$ for V, and a fixed ordered basis $\beta = \{\bar{w}_1, \dots, \bar{w}_m\}$ for W.

Let T be any linear transformation in $L(V, W)$. Then we can find the matrix of T with respect to the basis α and β, let us call it $[T]_{\alpha \to \beta}$

The mapping $\phi : L(V, W) \to F^{m \times n}$ which takes a linear transformation T to its matrix $[T]_{\alpha \to \beta}$ is an isomorphism