Math H110 Definitions.

1. **Endomorphism.** An endomorphism is a group homomorphism from a set to itself (NOTE: does not have to be invertible.)

2. **End V.** The symbol End$V$ is the set of all endomorphisms on V (and multiplication on End$V$ is defined to be function composition).

3. **F-Module.** An $F-$module is a generalization of vector spaces over rings.

4. **Subspace.** Let V be a vector space. X is a subspace of V if $X \subseteq V$ and closed under all relevant operations of V, $X \neq \emptyset$, and $X \ni 0$.

5. **Linear Map / Linear Transformation.** Let V be a vector space over a field F with $v, w \in V$. Let T be a map on V with $T(v+w) = T(v) + T(w)$ and $T(\lambda v) = \lambda T(v)$ for all $\lambda \in F$. Then, T is called a linear map or linear transformation.

6. **Linear Operator.** If T is linear transformation on a vector spaces V with $T : V \to V$, then T is linear operator on V.