The set $S$ of positive integers that may appear as the genus of a finite abelian group is called the genus spectrum of abelian groups. We will look at the genus spectrum of abelian groups for the strong symmetric genus $S_\sigma$ and for the real genus $S_\rho$. We obtain a set of (simple) necessary and sufficient conditions for an integer $g$ to belong to $S_\sigma$. We also prove that the set $S_\sigma$ has an asymptotic density and that density is approximately .3284. The situation for the real genus is considerably more complicated. We obtain a set of necessary conditions for an integer $g$ to belong to $S_\rho$. We also prove that the real genus of an abelian group is not congruent to 3 (modulo 4) and that the real genus of an abelian group of odd order is a multiple of 4. Finally, we obtain upper and lower bounds for the density of the set $S_\rho$. (Received August 07, 2017)