The aim of his thesis is to construct matrix representations of the Lie groups $\mathrm{Spin}(n) = \mathrm{Spin}(0, n, \mathbb{R})$ in dimensions from one to six. After we construct the double-cover of the group $\mathrm{SO}(3)$ using the group $\mathrm{SU}(2)$ in the first chapter, we will define the Clifford algebra, which we will use to construct the spin group in general. We will also describe how the spin group $\mathrm{Spin}(n)$ provides a double-cover of the group $\mathrm{SO}(n)$. Using this theory, we will then construct matrix representations of the Clifford algebra and the spin group $\mathrm{Spin}(n)$ in all the low dimensions listed above respectively. Apart from Clifford algebra, all arguments in this thesis will be based only on linear algebra and elementary group theory.