Abstract: Complex quantum groups are certain deformations of classical complex semisimple Lie groups like $SL(n, \mathbb{C})$, obtained using the Drinfeld double construction. We shall first carefully explain the definition of these quantum groups, and then discuss their structure and representation theory. In addition, we will indicate how complex quantum groups are connected with problems in the study $C^*$-tensor categories, noncommutative geometry and $K$-theory.