The aim of this thesis is to describe and derive the test of analysis of variance with random effects. At first we introduce a summary of results from the theory of probability which will be important in future derivations. Then we define the one-way classification model with fixed effects and propose the test statistics to test the equality of group means. In the following part we define the one-way classification model with random effects and derive properties of observations in this model. Under the assumption of balanced data we define sums of squares and derive their properties, which allow us to use them to create the test statistic. Finally we will use simulations in R to verify whether the ANOVA test with random effects observes the significance level when normality assumptions are violated.