**Project Description**

Using two different aerofoils, our group will use the equation for lift to determine the relationship between the angle of attack and the coefficient of lift of an aerofoil. From this data, we will determine the constant of proportionality that relates angle of attack to the coefficient of lift for each individual aerofoil. Thus, we aim to determine the aerofoil that is able to maintain flight and resist stall for the greater angles of attack.

The air speed will remain constant throughout the experiment, the angle of attack will instead by changed, and then measured in order to graph coefficient of lift vs angle of attack.

**Description of Project**

The project will investigate the linear relationship that exists between the coefficient of lift, C\_L, and the angle of attack. In order to measure, and thus derive the relationship, we will need to measure the lift, airspeed, surface area of the aerofoil, and the angle of attack for the specific aerofoil used. The airspeed, and the surface area of the aerofoil will be kept constant throughout the experiment for each aerofoil. Thus the only variable that will be changed is the angle of attack. As a result, we will measure the change in lift that is experienced by the aerofoil. Finally, using the equation for lift (insert), we are able to calculate the corresponding coefficient of lift for that angle of attack. This will be repeated until the lift begins to drop, corresponding to stall conditions experienced by the aerofoil. We will repeat this with the other two (or one) aerofoils, to obtain separate graphs of the aerofoils angle of attack versus the coefficient of lift.

To measure the angle of attack of the aerofoil, we will have the aerofoil mounted on an apparatus that keeps it stationery and allows us to swivel the aerofoil in the angle we desire, and fix it in that position. Thus, using a protractor, we will be able to record the angle the aerofoil is set at in relation to the horizontal axis.

To measure lift, the aerofoil shall rest on a set of electronic scales, that will record its weight throughout the duration of each experimental trial. Thus, as the air is passed over the aerofoil, the aerofoil will experience lift and the scale will indicate that the aerofoil weighs less. Using Newtons second law, we can calculate the lift force produced and record it.

Using the lift equation, we can calculate the coefficient of lift that relates to the set angle of attack. After multiple angles of attack, we will graph angle of attack versus coefficient of lift to determine the linear relationship between the two variables, and the coefficient of proportionality for each aerofoil from the gradients of the graphs. Using this data, and the results where the lift begins to fall, we will analyse the data and determine any correlation between the angle of attack, and the aerofoil, and at what angle it stalls, thus determining which aerofoil is the most resistant to stall.