ENE 411 WIND ENERGY EXPERIMENT
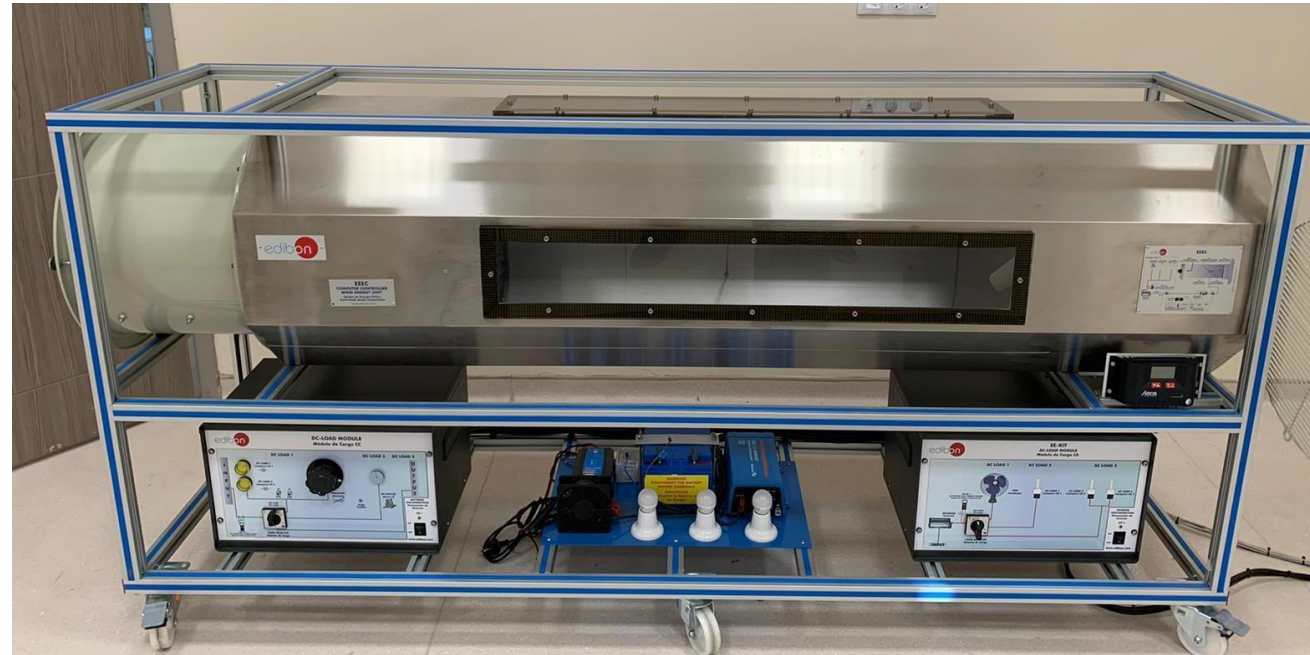
EXPERIMENTAL SETUP
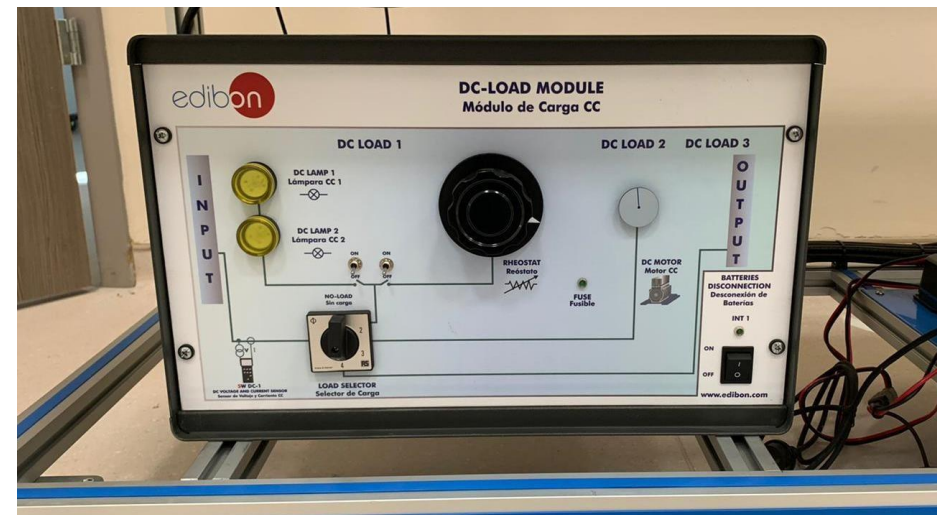

Wind tunnel

EXPERIMENTAL SETUP

Aerogenerator
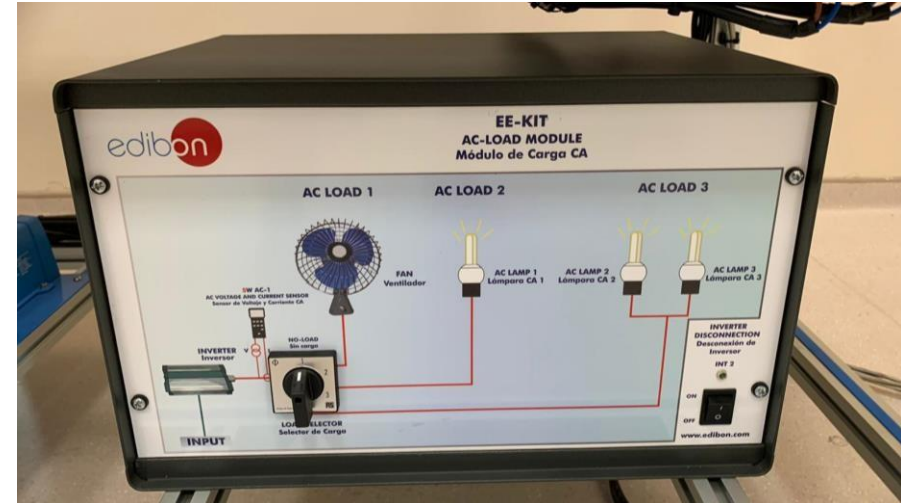

DC Load Module

EXPERIMENTAL SETUP

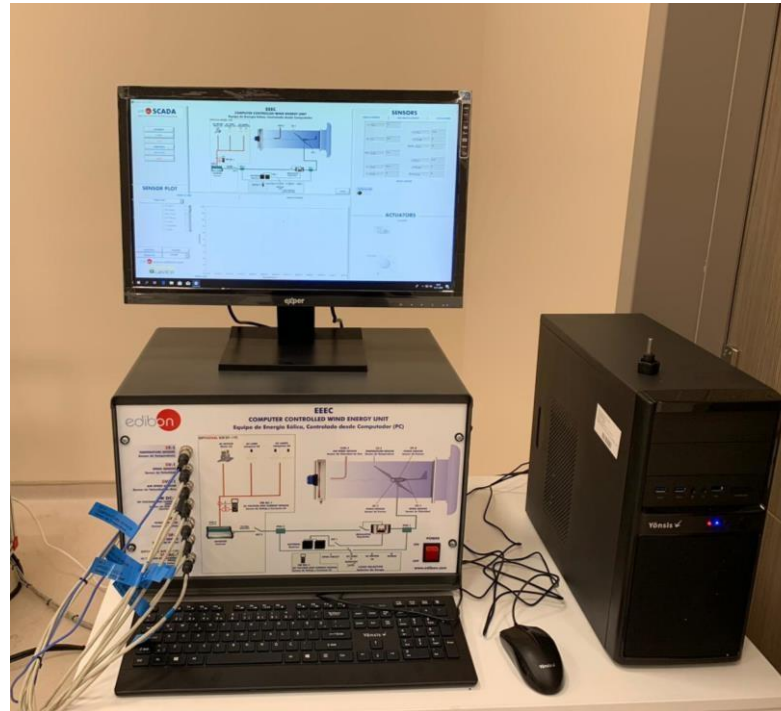
AC Load
Attachments

AC Load Module

EXPERIMENTAL SETUP

Main Module

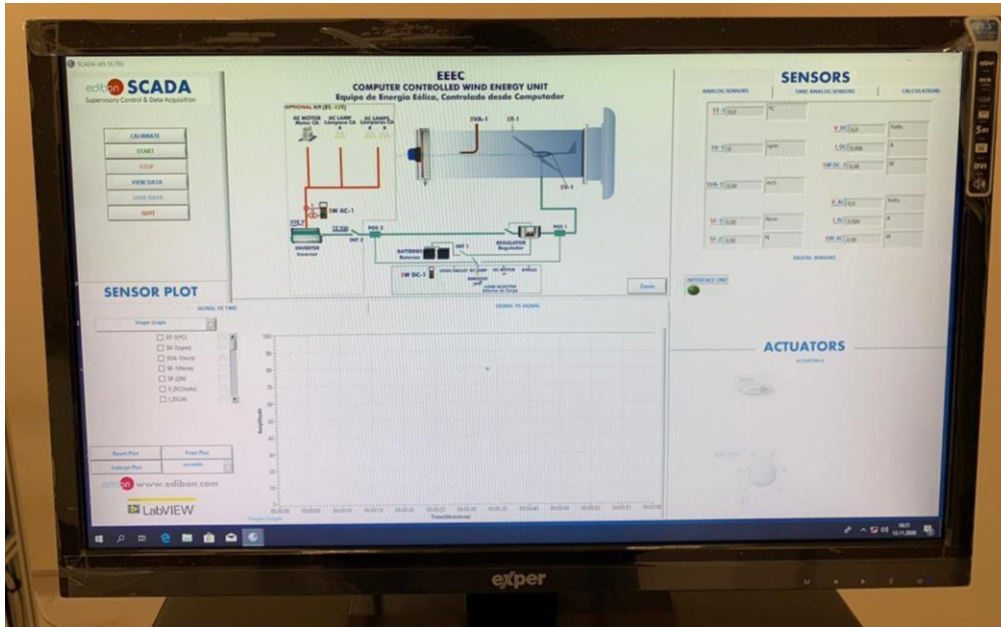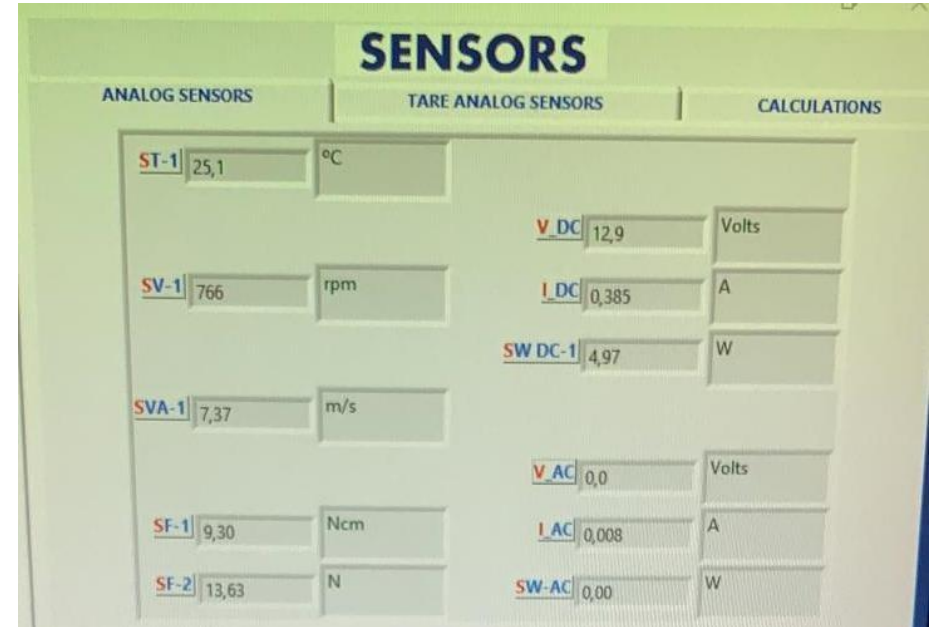# EXPERIMENTAL SETUP

Main Interface

Sensors

EXPERIMENT 1
POWER CHARACTERISTIC COMPARISON OF TWO BLADED AND SIX BLADED AEROGENERATOR

EXPERIMENTAL PROCEDURE

- Aerogenerator is set to upwind two bladed configuration.

- Fan speed is increased gradually.

- Wind speed, generated power and temperature datas are taken each second.

- Same steps are repeated with six bladed configuration.

EXPERIMENT 1

In experiment 1, you should calculate the power coefficient for each given produced power datas and draw Cp-Wind Speed graphs for 2 bladed and 6 bladed wind turbine configurations.

Aim of this experiment is to show how number of blades influence on power characteristic of wind turbines.

Also you should mention the solidity and its effect on wind energy harvesting in your reports.

POWER CHARACTERISTIC COMPARISON OF TWO BLADED AND THREE BLADED AEROGENERATOR

EXPERIMENTAL PROCEDURE

- Aerogenerator is set to upwind two bladed configuration.

- Fan speed is increased gradually.

- Wind speed, generated power and temperature datas are taken each second.

- Same steps are repeated with three bladed configuration.

EXPERIMENT 2

In experiment 2 you should calculate the power coefficient for each given produced power datas and draw Cp-Wind Speed graphs for 2 bladed and 3 bladed wind turbine configurations.

Aim of this experiment is to show how number of blades influence on power characteristic of wind turbines.

Also you should mention the solidity and its effect on wind energy harvesting in your reports.

EXPERIMENT 3
POWER CHARACTERISTIC COMPARISON OF THREE BLADED AND SIX BLADED AEROGENERATOR

EXPERIMENTAL PROCEDURE

- Aerogenerator is set to upwind three bladed configuration.

- Fan speed is increased gradually.

- Wind speed, generated power and temperature datas are taken each second.

- Same steps are repeated with six bladed configuration.

EXPERIMENT 3

In experiment 3 you should calculate the power coefficient for each given produced power datas and draw Cp-Wind Speed graphs for 3 bladed and 6 bladed wind turbine configurations.

Aim of this experiment is to show how number of blades influence on power characteristic of wind turbines.

Also you should mention the solidity and its effect on wind energy harvesting in your reports.

EXPERIMENT 4
WIND DIRECTION EFFECT ON THREE BLADED AEROGENERATOR'S ENERGY HARVESTING CAPABILITIY

EXPERIMENTAL PROCEDURE

- Aerogenerator is set to upwind three bladed configuration.

- Fan speed is increased gradually.

- Wind speed, generated power and temperature datas are taken each second.

- Same steps are repeated with different angular positions clockwise direction or counter clockwise direction.

EXPERIMENT 4

In experiment 4, you should calculate the power coefficient for each given produced power datas and draw a Cp-wind speed graph for each case. You should show the maximum and mean Cp datas in a graph for each angular position.
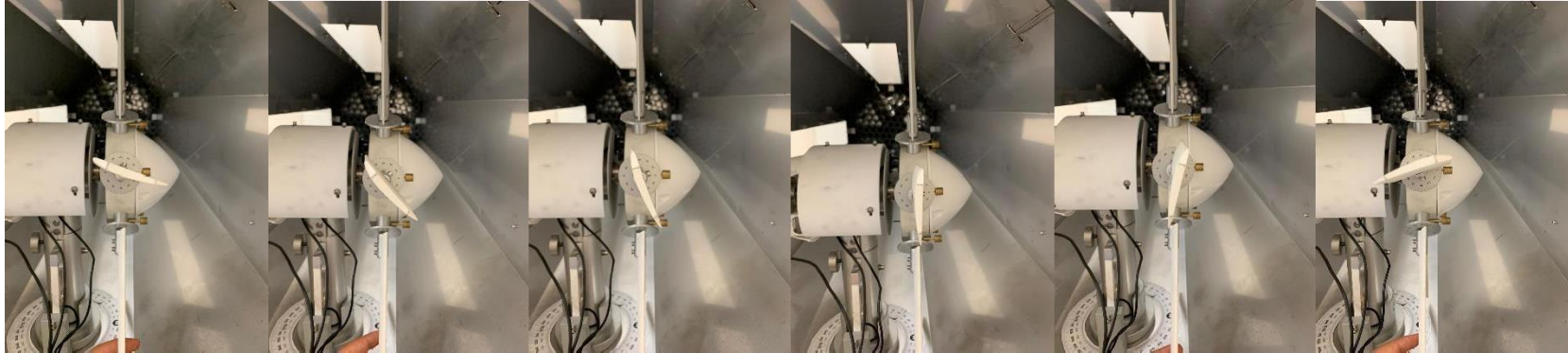
You should indicate why and how the wind direction effects the wind turbine's power generation.

Also you should mention overcome this problem in modern wind turbine technology.

EXPERIMENT 5
ANGLE OF ATTACK EFFECT ON THREE BLADED AEROGENERATOR'S ENERGY HARVESTING CAPABILITIY

EXPERIMENTAL PROCEDURE

▪Aerogenerator is set to upwind three bladed configuration.

▪Fan speed is increased gradually.

▪Wind speed, generated power and temperature datas are taken at each second.

▪Same steps are repeated with different blade angular positions for clockwise direction or counter clockwise direction.

EXPERIMENT 5

In experiment 5, you should calculate the power coefficient for each given produced power datas. You should show the Cp datas in a graph for each blade angular position.

You should indicate why and how the blades angular position effects the wind turbine's power generation.

Also you should mention how overcome this problem in modern wind turbine technology.