# Meteorological Data Analysis Lab

## Lab 1: concepts and properties of probability

## Purpose:

This Lab presents the basic concepts and properties of probability also using Microsoft Excel to compute the Relative Frequency " the probability".

## Theory:

An experiment is a process that, when performed, results in one and only one of many observations. These observations are called the outcomes of the experiment. The collection of all outcomes for an experiment is called a sample space.

Probability, which gives the likelihood of occurrence of an event, is denoted by P. The probability that a simple event $E_i$ will occur is denoted by $P(E_i)$, and the probability that a compound event A will occur is denoted by $P(A)$. The two Properties of Probability are :

1. The probability of an event always lies in the range 0 to 1.

Whether it is a simple or a compound event, the probability of an event is never less than 0 or greater than 1. Using mathematical notation, we can write this property as follows.

$$0 \leq P(E_i) \leq 1$$

$$0 \leq P(A) \leq 1$$

2. The sum of the probabilities of all simple events (or final outcomes) for an experiment,

denoted by _P($E_i$), is always 1.

$$\sum P(Ei) = P(E1) + P(E2) + P(E3) + \cdots = 1$$

Using Relative Frequency as an Approximation of Probability If an experiment is repeated n times and an event A is observed f times (frequency), then, according to the relative frequency concept of probability,

$$P(A) = \frac{f}{n}$$

## Methodolody:

The rainfall was measured within 20 days and the observations were as follows in mm:

11  13  16  17  19  20  22  22  23  25  26  26  27  28  30  31  32  36  37  42

1. Make the probability and cumulative Probability table , let class width is 4 (10-14) mm.
2. Plot the cumulative Probability curve of above data .
3. What is the probability of rain less than 24.5 mm.
4. What is the probability of rain between 24.5 mm and 34.5 mm.

**Note (using Microsoft Excel to solve the questions)**