PHYSICAL EDUCATION

Subject : Physical Education
Semester : 4th
Paper No. and Title : (401) Test, Measurement and Evaluation in Physical Education

Unit 2: Frequency Table and its Construction

2.0. Objectives:

After collecting data, they must be classified and presented in meaningful forms to have better insight of a data set.

One of the main aspects of describing a data set is summarization and description of the overall pattern of the data by Presentation of tables and graphs.

This unit introduces the frequency distribution or frequency table and techniques of construction of a frequency table. After reading this unit we will be able to:

- define frequency table
- understand meaning, importance and uses of frequency table
- construct frequency table for grouped and ungrouped data

2.1. Meaning of Frequency Table:

Raw data are collected data that have not been organized numerically. In summarizing large masses of raw data, it is often useful to distribute the data into classes, or categories, and to determine the number of individuals belong to each class, called the class frequency.

A tabular arrangement of data by classes together with the corresponding class frequencies is called a frequency distribution or frequency table.

Roll No.	Marks	Roll No	Marks	Roll No	Marks

Frequency table or distribution are of two types:

(1) Discrete Frequency table

(2) Grouped (or Continuous) Frequency table

2.2. Discrete Frequency Table:

The construction of a discrete frequency table from the raw data are illustrated with an example.

Example 1.The marks obtained by 30 students in a class test, out of 50 marks, according to their roll numbers are:

41,25,5,33,12,21,19,39,19,21,12,1,19,12,19,17,12,17,17,41,41,19,41,33,12,21,33,5,1,21.

The above raw data can be arranged in serial order as follows:

Table 2.1.

1	41	11	12	21	41
2	25	12	1	22	19
3	5	13	19	23	41
4	33	14	12	24	33
5	12	15	19	25	12
6	21	16	17	26	21
7	19	17	12	27	33
8	39	18	17	28	5
9	19	19	17	29	1
10	21	20	41	30	21

The data in the example 1 can be represented in the tabular form as follows:

Marks	Tally Marks	No. of Students(Frequency)
1	||	2

Table 2.2.

5	||	2
12	||||	5
17	|||	3
19	||||	5
21	||||	4
25	|	1
33	|||	3
39	|	1
41	||||	4
Total		30

The presentation of data in the form of above table is called Discrete Frequency Table. The above tabular presentation is also called Ungrouped Frequency Table.

2.3. Grouped Frequency Table:

The presentation of raw data in the example 1 can be further condensed into groups or classes.

The arrangement of raw data into classes can be made as follows:

Table 2.3.

Marks obtained	Tally Marks	No. of Students(Frequency)
1-10	||||	4
11-20	|||| |||| |||	13
21-30	||||	5
31-40	||||	4
41-50	||||	4
Total		30

The presentation of data in the form of above table is called Grouped or Continuous Frequency Table. Although the grouping process generally destroys much of the original detail of the data, an important advantage is gained in the clear "overall" picture that is obtained and in the vital relationships that are thereby made evident.

We now define certain statistical terms required for construction of a grouped frequency table:

- **Range:** It is the difference between the largest and the smallest number in the given data.
- **Class Intervals:** The range of the marks from 1 to 50 is grouped into five classes or groups viz. : 1-10,11-20,21-30,31- 40, 41-50. Each group is known as class interval.
- **Class Limits:** The end values of a class are called class limits. The smaller number (1) is lower class limit and the larger number (10) is the upper class limit.

- **Class Boundaries:** The class boundaries are the limits up to which the two limits, of each class may be extended to fill up the gap that exists between the classes.

Lower class boundary= lower class limit- ½ of the gap

= 1-1/2 x 1

= 0.5

Upper class boundary= upper class limit + ½ of the gap

= 10 + ½ x 1

= 10.5

- **Class size or class width or class length:** The size, or width, of a class interval is the difference between the lower and upper class boundaries and is also referred to as the class size, class width or class length.

- **Mid-point**: The central value of the class interval is called the mid-point.

Mid point of a class = $\frac{Lower\ class\ limit + Upper\ class\ limit}{2}$

= (1+ 10)/2

= 5.5

2.4. Construction of Discrete Frequency Table:

The table is constructed by the following steps:

Step 1: Prepare three columns viz. class, tally marks and frequency for the corresponding variable.

Step 2: Arrange the given data from the lowest to the highest in the first column under the heading class.

Step 3: Take the first observation in the raw data and put a bar in the column tally mark. Continue this process till all the observations of the given data are exhausted.

Step 4: Count the tally marks of column 2 and place this number in the frequency column.

Step 5: Give a suitable title to the frequency distribution table so that it exactly conveys the information contained in the table.

2.5. Construction of Grouped Frequency Table:

The grouped frequency table is constructed by the following steps:

Step 1: Find the maximum and minimum value of the variate occurring in the data which is termed as range.

Step 2: Then decide the number of classes to be formed. Classes should be in the range of 5 to 15.

Step 3: Then divide the range by the number of classes in order to determine the class interval.

Step 4: Take each value from the data and put a tally mark under the column tally mark against the class to which the item belong. Continue this process till all the values of the given data are exhausted.

Step 5: Count the tally marks of column 2 and place this number in the frequency column.

Step 6: Give suitable item to the frequency table so that it conveys exactly the information contained in it.

2.6. Cumulative Frequency Table:

One of the important types of frequency table is Cumulative Frequency Table. Cumulative frequency corresponding to a class is the sum of all the frequencies upto and including that class. A table showing the cumulative frequencies is called a cumulative frequency distribution.

Cumulative frequency table are of two types:

1. Less than Cumulative Frequencies Table.
2. More than Cumulative Frequencies Table.

Let us illustrate with an example 2, where we are given marks obtained by 100 students.

Table 2.4.

Marks Obtained	No. of Students
30-40	8
40-50	12

50-60	20
60-70	25
70-80	18
80-90	17

Less than Cumulative Frequency Table:

Table 2.5.

Marks Obtained	No. of Students
Less than 40	8
Less than 50	20(=8+12)
Less than 60	40(=20+20)
Less than 70	65(=40+25)
Less than 80	83(=65+18)
Less than 90	100(=83+17)

2.7. Importance of Frequency table:

Frequency and Frequency table or distribution is a very important concept. Frequency is a simple way to describe the number of occurrence of a particular value and its characteristics in a sample. The table summarizes the distribution of values in a sample. The commonly used graph of a frequency distribution are Histogram, Frequency polygon, Frequency curve and Cumulative

Frequency Curve or Ogive. They are useful for locating partition values viz. Median, Quartiles, Deciles, Percentiles, etc.