



**KARPAGAM ACADEMY OF HIGHER EDUCATION**  
*(Deemed to be University, Established Under Section 3 of UGC Act 1956)*  
**Coimbatore – 641 021.**

**Semester VI**

16BCU612A

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**BIOSTATISTICS PRACTICAL**

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1. Mean for individual, discrete series using SPSS Package.
2. Mean for continuous series using SPSS Package.
3. Median for individual and discrete series using SPSS Package..
4. Median for continuous series using SPSS Package..
5. Mode for individual and discrete series using SPSS Package..
6. Standard deviation for individual and discrete series using SPSS Package.
7. Coefficient of variation for individual and discrete series using SPSS Package.
8. Karl Pearson's Correlation using SPSS Package.
9. Rank Correlation Coefficient for Untied Rank using SPSS Package.
10. Rank Correlation Coefficient for Tied Rank using SPSS Package.

**REFERENCES**

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### LECTURE PLAN DEPARTMENT OF BIOCHEMISTRY

**STAFF NAME: Dr.K.Poornima**

**SUBJECT NAME: Biostatistics practical**

**SUB.CODE: 16BCU612A**

**SEMESTER: VI**

**CLASS: III B.Sc. (BC)**

Sl. No	Duration of Period	Topics to be Covered	Support material
1	4	Mean for individual, discrete series using SPSS Package.	SPSS -16 Package
2	4	Mean for continuous series using SPSS Package.	
3	4	Median for individual, discrete and continues series using SPSS Package..	
4	4	Mode for individual and discrete series using SPSS Package..	
5	4	Standard deviation for individual and discrete series using SPSS Package.	
6	4	Coefficient of variation for individual and discrete series using SPSS Package.	
7	4	Karl Pearson's Correlation using SPSS Package.	
8	4	Rank Correlation Coefficient for Untied Rank using SPSS Package.	
9	4	Rank Correlation Coefficient for Tied Rank using SPSS Package.	
10	4	Model practical examination	

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Pollachi Main Road, Coimbatore – 641 021, Tamil Nadu

**Department of Biochemistry****Subject: Statistics Practical**  
**Subject Code : 16BCU612A****Semester VI**  
**Class : III B.Sc****Ex. No: 01****INTRODUCTION TO SPSS PACKAGE****Objective**

To understand how SPSS package is useful for the purpose of data analysis.

**Introduction**

Originally it is an acronym of “Statistical Package for the Social Science” but now it stands for “Statistical Product of Service Solution”.

One of the most popular statistical packages which can perform highly complex data manipulated and analysis with simple instruction.

**The Four Windows**

- ❖ Data Editor
- ❖ Output Viewer
- ❖ Syntax Editor
- ❖ Script Window

**The Basic Analysis of SPSS Frequencies**

The Analysis produces frequency table showing frequency counts and percentage of the values of individual variable.

**Descriptive**

This analysis shows the maximum, minimum, mean and standard deviation of the variables.

**Correlation and Linear Regression Analysis**

Association between correlation and linear regression estimates the co-efficient of the linear equation.

**Chi-Square, ANOVA, T-Test**

Independence (cross table), Frequency (Goodness of fit) one way and two way ANOVA and test.

**Ex No: 02**

## **WORKING WITH WINDOWS IN SPSS**

### **Objectives**

To understand how the windows in SPSS work.

### **The Four Windows**

Data Editor

Output Viewer

Syntax Editor

Script Window

### **Data Editor**

Spread sheet like system for defining entering, editing and displaying data, extension of the saved file will be 'save'.

### **Output Viewer**

Displaying output and errors, extension of the saved file will be 'SPV'.

### **Syntax Editor**

Text editor for syntax composition extension of saved file will be 'SPS'.

### **Script Window**

To provides the opportunity to write full-blown programs in a basic like language. Tex editor for syntax composition extension of saved file will be 'SBS'.

**Ex.No: 03**

## **WORKING WITH VARIABLE VIEW WINDOW IN SPSS**

### **Objective**

To know how to define variables in the variable view in data editor view.

### **Opening SPSS**

Start→ All programs→SPSSInc→ SPSS.

There are two sheets in the window.

- Data View
- Variable View

### **Data View Window**

The data view window.

This sheet is visible when you first open the data editor and this sheet contains the data.

Click on the tab labeled variable view.

### **Variable View Window**

This sheet contains information about the data set that is stored with the data set.

#### **Name**

The first character of the variable name must be alphabetic.

Variable names must be unique, and have to be less than 64 characters.

Spaces are NOT allowed.

#### **Type**

Click on the “type” box .The two basic types of variables that you will use are numeric and string. This column enables you to specify the type of variable.

#### **Width**

Width allows you to determine the number of character SPSS will allow to be entered for the variable.

#### **Decimals**

Number of decimals.

It has to be less than or equal to 16.

#### **Label**

You can specify the details of the variable.

You can write characters with spaces upto 256 characters.

#### **Values**

This is used and to suggest which numbers represent which categories when the variable represents a category.

#### **Defining The Value Label**

Click the cell in the value column.

For the value, and the label, you can put upto 60 characters.

After defining the values click add and then click OK.

**Ex.No:1****Mean for individual series using SPSS package.****Objective**

To know how to calculate the mean for individual series using SPSS package.

**Algorithm:**

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in variable view

**Step 3:** Click “Data view” and enter the given data

**Step 4:** Click Analyse → Descriptive statistics → Frequencies

**Step 5:** Click statistic option to choose the mean.

**Step 6:** Select “continue” and click “ok”.

**Problem**

Calculate the mean for the following data using SPSS package.

<b>Roll no</b>	1	2	3	4	5	6	7	8	9	10
<b>Marks</b>	40	50	55	78	58	60	73	35	43	48

$$\bar{X} = \frac{\sum x}{N}$$

$$= \frac{540}{10}$$

$$= \mathbf{54}$$

**Inference**

The mean for the given data of individual series using SPSS Package is **54**.

**Ex.No:1****Mean for Discrete series using SPSS package.****Objective**

To know how to calculate the mean for discrete series using SPSS package.

**Algorithm:**

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in variable view

**Step 3:** Click “Data view” and enter the given data

**Step 4:** If the variable ‘X’ occurs 5 times, then we have to type the variable 5 times.

**Step 5:** Click Analyse → Descriptive statistics → Frequencies

**Step 6:** Click statistic option to choose the mean.

**Step 7:** Select “continue” and click “ok”.

**Problem**

Calculate the mean for the following data using SPSS package.

<b>Value</b>	1	2	3	4	5	6	7	8	9	10
<b>Frequency</b>	21	30	28	40	26	34	40	9	15	57

$$\begin{aligned}
 \bar{X} &= \frac{\sum fx}{N} \\
 &= \frac{1716}{300} \\
 &= 5.72
 \end{aligned}$$

**Inference**

The mean for the given data of discrete series using SPSS package is **5.72**

**Ex.No:2**

**Mean for continuous series using SPSS package.**

**Objective**

To know how to calculate the mean for Continuous series using SPSS package.

**Algorithm:**

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in the variable view

**Step 3:** Find out the mid-point of X variable.

**Step 4:** Click data views and enter the given data.

**Step 5:** If midpoint of the variable 'X' occurs 5 times, then we have to type the midpoint of the variable 5 times.

**Step 6:** Click Analyse → Descriptive statistics → Frequencies

**Step 7:** Click statistic option to choose the mean.

**Step 8:** Select "continue" and click "ok".

**Problem**

Calculate the mean for the following data using SPSS package.

Profits Rs.	Mid-point (m)	No.of shops (f)	fm
100 - 200	150	10	1500
200 - 300	250	18	4500
300 - 400	350	20	7000
400 - 500	450	26	11700
500 - 600	550	30	16500
600 - 700	650	28	18200
700 - 800	750	18	13500
		<b>∑f = 150</b>	<b>∑fm = 72900</b>

$$\begin{aligned}
 X &= \frac{\sum fm}{N} \\
 &= \frac{72900}{150} \\
 &= \mathbf{486}
 \end{aligned}$$

**Inference**

The mean for the given data of continuous series using SPSS package is **486**.

**Ex.No:3****Median for individual series using SPSS package****Objective**

To know how to calculate the median for individual series using SPSS package.

**Algorithm:**

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in the variable view

**Step 3:** Arrange the given data in ascending or descending order

**Step 4:** Click data views and enter the given data.

**Step 5:** Click Analyse → Descriptive statistics → Frequencies

**Step 6:** Click statistic option to choose the median.

**Step 7:** Select “Continue” and click “ok”.

**Problem**

Calculate the median for individual series the following data using SPSS package.

S.No	Size of item ascending order (X)	Size of item descending order (X)
1	9	25
2	10	19
3	15	15
4	19	10
5	25	9

$$\text{Median} = \text{size of } \frac{N+1}{2}$$

$$= \text{size of } \frac{5+1}{2}$$

$$= 3^{\text{rd}} \text{ item}$$

**= 15**

**Inference**

The median for the given data of individual series using SPSS package is **15**.

Ex.No:3

**Median for Discrete series using SPSS package.**

**Objective**

To know how to calculate the median for discrete series using SPSS package.

**Algorithm:**

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in the variable view

**Step 3:** Arrange the given data in ascending or descending order

**Step 4:** Click data views and enter the given data.

**Step 5:** If the variable 'X' occurs 5 times, then we have to type the variable 5 times.

**Step 6:** Click Analyse → Descriptive statistics → Frequencies

**Step 7:** Click statistic option to choose the median.

**Step 8:** Select "Continue" and click "ok".

**Problem**

Calculate the median for discrete series the following data using SPSS package.

Size of shoes	f	Cumulative frequency (Cf)
5	10	10
5.5	16	26
6	28	54
6.5	15	69
7	30	99
7.5	40	139
8	34	173

$$\begin{aligned}\text{Median} &= \text{size of } \frac{N+1}{2} \\ &= \text{size of } \frac{173+1}{2} \\ &= 87^{\text{th}} \text{ item} = 7\end{aligned}$$

**Median of size of the shoe = 7**

**Inference**

The median for the given data of discrete series using SPSS Package is 7.

Ex.No:4

### Median for Continuous series using SPSS package.

#### Objective

To know how to calculate the median for continuous series using SPSS package.

#### Algorithm:

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in the variable view

**Step 3:** Arrange the given data in ascending or descending order

**Step 4:** Find out the mid-point of X variable.

**Step 5:** Click data views and enter the given data.

**Step 6:** If midpoint of the variable 'X' occurs 5 times, then we have to enter the midpoint of the variable 5 times.

**Step 7:** Click Analyse → Descriptive statistics → Frequencies

**Step 8:** Click statistic option to choose the median.

**Step 9:** Select "Continue" and click "ok".

#### Problem

Calculate the median for continuous series the following data using SPSS package.

Marks	Frequency(f)
10-25	6
25-40	20
40-55	44
55-70	26
70-85	3
85-100	1

$$\text{Median} = L + \frac{N/2 - C_f}{f} * i$$

$$= 48.18$$

#### Inference

The median for the given data of continuous series using SPSS Package is **48.18**.

**Ex.No:5****Mode for individual series using SPSS Package.****Objective**

To know how to calculate the mode for individual series using SPSS package.

**Algorithm:**

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in the variable view

**Step 3:** Click data views and enter the given data.

**Step 4:** Click Analyse → Descriptive statistics → Frequencies

**Step 5:** Click statistic option to choose the mode.

**Step 6:** Select “continue” and click “ok”.

**Problem**

Calculate the mode for individual and discrete series the following data using SPSS package.

**Individual series**

**850,750,600,825,850,725,600,850,640,530**

The mode salary is **850**

**Inference**

The mode for the given data of individual series using SPSS package is **850**

**Ex.No:5****Mode for individual and discrete series using SPSS Package.****Objective**

To know how to calculate the mode for individual and discrete series using SPSS package.

**Algorithm:**

**Step 1:** Start → all programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in the variable view

**Step 3:** Click data views and enter the given data.

**Step 4:** Click Analyse → Descriptive statistics → Frequencies

**Step 5:** Click statistic option to choose the mode.

**Step 6:** Select “continue” and click “ok”.

**Problem**

Calculate the mode for individual and discrete series the following data using SPSS package.

**Discrete series**

**Calculate the mode from following**

Size	Frequency
10	10
11	12
12	15
13	19
14	20
15	8
16	4
17	3
18	2

**Grouping table**

<b>Size</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>10</b>	<b>10</b>					
<b>11</b>	<b>12</b>	<b>22</b>		<b>37</b>		
<b>12</b>	<b>15</b>		<b>27</b>		<b>46</b>	
<b>13</b>		<b>34</b>				<b>54</b>
<b>14</b>	<b>19</b>		<b>39</b>			
<b>15</b>	<b>20</b>			<b>47</b>		
<b>16</b>		<b>28</b>				
<b>17</b>	<b>8</b>		<b>12</b>		<b>32</b>	
<b>18</b>	<b>4</b>			<b>9</b>		<b>15</b>
	<b>3</b>	<b>7</b>				
	<b>2</b>		<b>5</b>			

**Analysis Table**

S.no	Size of item containing maximum frequency					
	0	11	12	13	14	15
1					1	
2			1	1		
3				1	1	
4				1	1	1
5		1	1	1		
6			1	1	1	
		1	3	5	4	1

**Inference**

The mode for the given data of discrete series using SPSS package is **13**

**Ex. No: 07**

**STANDARD DEVIATION FOR INDIVIDUAL AND DISCRETE SERIES USING SPSS PACKAGE**

**Objective**

To calculate the standard deviation for individual and discrete series using SPSS package.

**Algorithm**

**Step 1:** Start → All programs → SPSS Inc. → SPSS

**Step 2:** Enter the description of variable in the variable view

**Step 3:** Click data views and enter the given data.

**Step 4:** In discrete series, if the variable 'X' occurs 5 times, then we have to enter the variable 5 times

**Step 5:** Click Analyse → Descriptive statistics → Frequencies

**Step 6:** Click Statistic option to choose the standard deviation

**Step 7:** Select "continue" and click "ok".

**Problem**

**Individual Series**

1. Calculate the standard deviation for the data given below using SPSS package.

x	25	18	27	10	30	42	20	53	20
---	----	----	----	----	----	----	----	----	----

**Formula:**

$$\text{Standard deviation} = \sqrt{\frac{\sum(x-\bar{x})^2}{n}}$$

**Discrete Series**

2. Calculate the standard deviation for the following data using SPSS package.

No of Members	1	2	3	4	5	6	7	8	9	10	11	12
Frequency	1	3	5	6	10	13	9	5	3	2	2	1

**Formula:**

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left[\frac{\sum fx}{\sum f}\right]^2}$$

**1. OUTPUT**

No. of students

N	Valid	9
	Missing	0
	Std. Deviation	13.14133

**2. OUTPUT:**

No. of members

N	Valid	60
	Missing	0
	Std. Deviation	2.35038

**Inference**

Standard deviation for the given data for individual series using SPSS Package is

**13.141.**

Standard deviation for the given data for discrete series using SPSS Package is **2.350.**

**Ex.No: 07**

**COEFFICIENT OF VARIATION FOR INDIVIDUAL SERIES AND DISCRETE SERIES USING SPSS PACKAGE**

**Objective**

To know how to calculate the coefficient of variation individual and discrete series using SPSS package.

**Algorithm**

**Step1:** Start → All programs → SPSS in C → SPSS.

**Step 2:** Enter the description of variable in the variable view

**Step3:** Click Analyze → Descriptive Statistics → Frequencies.

**Step4:** Click statistics option to choose the mean and standard deviation → continue and click ok.

**Step5:** Collect the mean and standard deviation values.

**Step6:** Click Transforms → Compute variables.

**Step7:** Enter the target values.

**Step8:** Finally find the coefficient of variation.

**Step9:** The result will be appeared in data view.

**Individual Series**

Calculate the coefficient of mean and standard deviation for the given data below:

<b>x</b>	25	18	27	10	30	42	20	53	20
----------	----	----	----	----	----	----	----	----	----

**Formula**

Formula for individual value for mean

$$\text{Mean} = \frac{\sum X}{N}$$

Where N=number of items.

**Calculation**

<b>X</b>
25
18
27
10
30
42
20
53
20

$$\sum X = 245 \quad \text{Mean} = \frac{245}{9} = 27.22$$

**Formula**

$$\begin{aligned} \text{Standard deviation} &= \sqrt{\frac{\sum X - \bar{X}}{n}} \\ &= \sqrt{\frac{1381.5556}{9}} = \sqrt{153.5061778} = 12.38976101 \\ \text{Standard deviation} &= 12.39 \end{aligned}$$

$$\begin{aligned} \text{Coefficient of variation of individual series value} &= \frac{\text{stddev}}{\text{mean}} \\ &= \frac{12.39}{27.22} \\ &= 0.45518 \end{aligned}$$

**OUTPUT**

**Individual Series**

N	Valid	9
	Missing	0
Mean		27.2222
Std. Deviation		13.14133

Coefficient of variation is = 0.48

**Discrete Series**

Calculate the coefficient of variation for the data given below using SPSS

<b>No.of. Members</b>	1	2	3	4	5	6	7	8	9	10	11	12
<b>Frequency</b>	1	3	5	6	10	13	9	5	3	2	2	1

**Formula**

$$\text{Mean} = \sum f_x / \sum f$$

**Calculation**

X	F	f <sub>x</sub>
1	1	1
2	3	6
3	5	15
4	6	24
5	10	50
6	13	78
7	9	63
8	5	40
9	3	27
10	2	20
11	2	22
12	1	12
$\sum f = 60$		$\sum f_x = 358$

$$\begin{aligned} \text{Mean} &= \sum f_x / \sum f \\ &= 358 / 60 = 5.96667 \\ \text{Mean} &= 5.9 \text{ (or) } 6.0 \end{aligned}$$

**Formula**

$$\text{Standard deviation} = \sqrt{\sum f_x^2 / \sum f - [\sum f_x / \sum f]^2}$$

**Calculation**

X	x <sup>2</sup>	F	f <sub>x</sub>	f <sub>x</sub> <sup>2</sup>
1	1	1	1	1
2	4	3	6	12
3	9	5	15	45
4	16	6	24	96
5	25	10	50	250
6	36	13	78	468
7	49	9	63	441
8	64	5	40	320
9	81	3	27	243
10	100	2	20	200
11	121	2	22	242
12	144	1	12	144
$\sum f = 60$		$\sum f_x = 358$	$\sum f_x^2 = 2462$	

$$\begin{aligned} \text{Standard deviation} &= \sqrt{2462 / 60 - [358 / 60]^2} \\ &= \sqrt{41.03 - [5.96]^2} \end{aligned}$$

$$=\sqrt{41.03 - 35.52}$$

$$=\sqrt{5.5}$$

$$= 2.347$$

Coefficient of variation of discrete series value = std.dev /mean

$$= 2.347 / 5.967$$

$$= 0.3933$$

## OUTPUT

### Discrete Series

N Valid	60
Missing	0
Mean	5.9667
Std. Deviation	2.35038

Coefficient of variation is = 0.39

## Inference

The coefficient of variation for the given data for individual series using SPSS Package is **0.48.**

The coefficient of variation for the given data for discrete series using SPSS Package is **0.39.**

Ex.No:9

**CALCULATION OF RANK CORRELATION USING SPSS PACKAGE**

**Aim:** To calculate the given value by Rank correlation coefficient in the package.

**Algorithm**

**STEP 1:** Start → All program → SPSS inc → SPSS.

**STEP 2:** Enter the description of variable in the variable view

**STEP 3:** Click analyze → Correlation → Bivariate.

**STEP 4:** Click the variable X and Y, Put it into the variable box.

**STEP 5:** Select Spearman check box and continues, then click ok in the bivariate box.

**STEP 6:** Finally we get the output.

**Calculation**

Calculate rank correlation coefficient for the following data using SPSS package.

<b>First exam Score(X)</b>	88	95	70	60	50	80	75	85
<b>Second exam Score (Y)</b>	84	90	88	55	48	85	82	72

**Formula**

$$=1 - \left( \frac{6\sum(D^2)}{N^3 - N} \right)$$

Where D = Different between X and Y

N = Number of observation

**Calculation**

X	Y	RX	RY	D=(RX-RY)	D=(RX - RY) <sup>2</sup>
88	84	2	4	-2	4
95	90	1	1	0	0
70	88	6	2	4	16
60	55	7	7	0	0
50	48	8	8	0	0
80	85	4	3	1	1
75	82	5	5	0	0
85	72	3	6	-3	9
					$\sum D^2 = 30$

$$=1 - \left( \frac{6\sum(D^2)}{N^3 - N} \right)$$

$$=1 - \left( \frac{6(30)}{(8^3 - 8)} \right)$$

$$=1 - \left( \frac{180}{8(64-1)} \right)$$

$$=1 - \left( \frac{180}{504} \right)$$

$$=1 - 0.3571 = 0.6429$$

**SPSS OUTPUT**

**Correlations**

			<b>first exam score x</b>	<b>second exam score y</b>
Spearman's rho	first exam score x	Correlation Coefficient	1.000	.643
		Sig. (2-tailed)	.	.086
		N	8	8
	second exam score y	Correlation Coefficient	.643	1.000
		Sig. (2-tailed)	.086	.
		N	8	8

**Inference**

0.25 ≤ 0.6429 < 0.75, moderate degree positive relationship existing between the first exam score and second exam score.

