NATIONAL OPEN UNIVERSITY OF NIGERIA

SCHOOL OF EDUCATION

COURSE CODE: EDU 721

COURSE TITLE: STATISTICAL METHODS I

EDU 721: STATISTICAL METHODS I

COURSE GUIDE

NATIONAL OPEN UNIVERSITY OF NIGERIA

DESCRIPTIVE STATISTICS

Unit I: The nature of data/scientific observations

- Meaning of data/observations
- Meaning of statistics
- Purposes of statistics
- Types of statistics: descriptive and inferential
- The nature of statistical methods

Unit II: Basic concepts in statistics

- Population
- Sample
- Parameter
- Estimates of statistics
- Measurements
- Errors of measurement

Unit III: Statistical notations/shorthand

Unit IV: Measurement scales:

- Nominal, ordinal, internal and ratio
- Types of variables: discrete and continuous
- Parametric versus non-parametric

Unit V: Organisation and presentation of data:

i. Organisation of data
ii. Frequency table
iii. Composite frequency table
iv. Pictograms or ideographs

Unit VI: Graphical representation of data:

- Bar graph
- Pie chart
- Histogram
- The frequency polygon
- Cumulative frequency curve
- Cumulative percentage curve

Unit VII: Measures of Central Tendency

- The Mean
- The Median
- The Mode

Unit VIII: Measures of variability/dispersion I
- The range
- The quartile deviation
- The deciles
- The percentiles

Unit IX: Measures of variability/dispersion II
- Mean deviation
- Variance
- Standard deviation

Unit X: Shapes of curves:
- The normal curve
- Properties of a normal curve
- Skewness
- Kurtosis

Unit XI: Some Measure of Association and Agreement I
The concept of correlation
The scatter grams:
Bivariate frequency distribution
The Pearson product moment correlation coefficient

Unit XII: Some measures of Association and Agreement II.
- Types of values and correlation methods
- Spearman-Brown Rank-order correlation coefficient
- Point-biserial correlation coefficient.

Unit XIII: Standard scores:
- The Z-scores
- The T-scores
- The stamine scores

INTRODUCTION

Edu 701 statistical methods I is a one semester course for all post graduate students pursuing masters' degree in education at the National Open University of Nigeria (NOUN). It can serve as a reference material for students in other schools or doing research in other fields. It is a three credit course which is compulsory for all education students at the masters' level.

The course will consist of 13 units which include the nature of data/scientific observations, basic concepts in statistics, statistical notations/shorthand, measurement scales, organisation and presentation of data, graphical representation of data, measures of central tendency, measures of variability/dispersion, shapes of curves, some measures of association and agreement and the standard scores. The material has been developed to suit learners in Nigeria by using examples from the local environment.

The course is designed for people who have earned a professional qualification in education. Most of the teachers would have been teaching for some time or would have been aspiring for leadership positions, in their various places of work. Others would have been in management/leadership positions as HODs, principals, supervisors etc where they will be expected to:

i. Read, comprehend and interpret technical papers, reports or records,
ii. Go beyond records of raw scores assigned to students scripts or answer papers in test situations
iii. Present, interpret and discuss the general characteristics of students from records of their performances given in numerical figures,
iv. Compare two or more groups of students
v. Predict outcomes and interpret/draw inference sometimes from large amount of data.

WHAT YOU WILL LEARN IN THIS COURSE

The overall aim of Edu 701, statistical methods I is to introduce you to descriptive statistics. During the course you will learn the meaning and types of statistics; types of data, scales and variables; organisation. Presentation and representation of data using tables, graphs charts etc. you will also learn how to describe the data using different methods or measures such as the central tendency, variability, association etc. You will in addition learn the types of corves and their properties; and how to transform raw scores into standard scores.

Statistics as a course is very necessary for you because there is nothing you will do in education which does not require your knowledge of it. Indeed there is no human

activity which is devoid completely of the knowledge of statistics. It is important in the home, in the farm, in the office in the market and in all aspects of life. This is why you must take it with every seriousness due to it.

COURSE AIMS

The main aim of the course is to introduce you to descriptive statistics and give you the understanding of how to present and represent your data and to describe your observations in data form.

This will be achieved by aiming to:

- Introduce you to the nature and types of data
- Outline the importance of data and statistics
- Compare and describe large groups of data in a concise statistical language
- Predict statistical out-come from a number of statistical observations.

COURSE OBJECTIVES

Each unit of the course has specific objectives which are included at the beginning of the unit. You are required to read them before you start working through the unit. You should always refer to them as you work through and at the end of the unit to check your progress. However the objectives of the course are as follows:

On successful completion of the course you should be able to:

1. Describe data and how to handle them.
2. Explain the concept of statistics and its importance.
3. Explain the types of statistics and their applications
4. Organise and represent data using various means
5. Present data in tables, graphs, charts etc
6. Compare data using the measures of central tendency
7. Describe data using the measures of dispersal
8. Describe data using the measures of association
9. Explain the properties of curves
10. transform raw scores to standard scores
11. Demonstrate how to compute using different formulae in descriptive statistics.

COURSE MATERIALS

These include: course guide, course material, text books, assignment files etc. in addition you should have a calculator, a mathematical set, graph sheets and statistical tables.

Study units
There are 13 study units in this course they are:

Unit 1	The nature of data/scientific observations
Unit 2	Basic concepts in statistics
Unit 3	Statistical notations
Unit 4	measurement scales
Unit 5	organisation and presentation of data
Unit 7	measures of central tendency
Unit 8	measures of variability/dispersion I
Unit 9	measures of variability/dispersion I
Unit 10	shapes of curves
Unit 11	some measures of association and agreement I
Unit 12	some measures of association and agreement II
Unit 13	standard scores.

Some of them are deliberately long for easy flow.

The course is designed to last for 15 weeks or a semester. It implies that each unit should be studied in one week. The reference books are listed after each unit. Statistics books are available in the markets and bookshops.

Assessment

Assessment in this course shall be made up of two parts. These are the

1. Tutor marked assignments TMAs which have a total of 40%. At least six TMA as should be submitted out of which the best four will be used for assessment and grading.

2. Examination: the written examination which shall last for three hours at the end of the course will have 60%

Both the TMAs and the examination must be passed at a minimum percentage before you can be successful in the course. The examination will consist of questions which reflect the types of self-assessment exercises and the TMA questions

You should use the time between finishing the last unit and sitting for the examinations for your revisions. Information from all parts of the course will be examined.

COURSE MARKING SCHEME

ASSESSMENT	MARKS
Assignment 1-6	At least six assignments to be submitted, out of which four will be used. At 10% each = 40% of course marks
Final examination	60% of overall course marks
Total	100% of course marks

How to get the most from this course:

Open and distance learning is not the same thing as face to face learning. Therefore, there is no lecturer in ODL. The self-learning material has replaced the lecture. This means that you can study the materials at your own time and place. The self-learning material can do every thing the lecturer can do for you, if you follow it carefully.

Each of the units follows the same pattern. The format ranges from:

i. Introduction
ii. Objectives
iii. The main body
iv. Conclusion
v. Summary
vi. TMA
vii. References

To work through without any hitch, follow the under-listed practical strategies.

a. Read the course guide thoroughly
b. Organise a study schedule
c. Stick to your study schedule
d. Assemble the study materials before you start reading.
e. Go through the introduction and objectives before any unit
f. Work through the units in sequence as provided
g. Keep in touch with the study centre and your facilitators
h. Do your assignments and submit as scheduled
i. Review the objectives at the end of each unit to confirm that you have achieved them.

j. On completing the last unit, review the course and prepare yourself for the final examination.

If you run into trouble contact your tutorial facilitator at the study centre or contact the course co-ordinator of the course at the Headquarters of National Open University of Nigeria, Victoria Island, Lagos. Note that both the facilitator and the co-ordinator are there to help you. Do not hesitate to call and ask them to help.

TUTORS AND TUTORIALS

Tutorials are provided in support of this course. You will be notified of the dates, time and locations of these tutorials, together with the names and phone numbers of your tutorial facilitator and the course-co-ordinator as soon as you are registered with National Open University of Nigeria at your study centre. Do not hesitate to contact your tutor or the course co-ordinator if you do not understand any part of the study units or the assigned readings; or you have difficulty with the self-tests or exercises; or if you have a question or problem with an assignment, tutor's comments on an assignment or with the grading of an assignment.

You should try to attend the tutorials regularly. This is the only way you can have face to face contact or interaction with the facilitator who is there to answer your questions.

SUMMARY

Edu 701: Statistical Method I is one of the two courses you will work through in your programme.

Edu 701 Is designed to teach you descriptive statistics upon the completion of this course you will be able to answer such questions as:

- What is statistics
- What are the types of data dealt with in statistics
- What are the purposes of statistics
- What are the types of statistics
- Why do we use samples instead of population
- What are the measurement scales
- What are the variables in statistics
- How do you organise data in statistics
- How do you present data
- How do you re-present data
- How does bar chart differ from histogram
- What are the measures of central tendency
- What are the measures of dispersion

- How does a normal curve differ from skewed curve
- What are the measures of agreement
- Why do you convert raw scores to standard scores

If you have completed the course successfully you would have been equipped with the basic knowledge of descriptive statistics. This means that you can answer even more questions that are given above. You are also equipped to do some arithmetic which you can do easily with your calculator.

We wish you success with the course, we hope you will find it very interesting. Enjoy your programme at National Open University Nigeria. We wish you every success in your future.