**ARI 2101 Introduction to Statistics and Data Analysis**

**Lecturer** Dr. Florence Birungi Kyazze B.Sc. Agric., M.Sc. Agric (Agric Econ.), PhD (Agricultural Education)

**Course Type**: **CORE (BARI II.)**

**Course Credits (CU)**: **3 CU i.e. 45 Contact Hours per semester**

Prerequisite: EEE 1201: Social Research Methods 1

**Course Duration**: **15 weeks (45 hours) i.e. 30 LH, 30 PH/TH**

**COURSE DESCRIPTION**

The course equips students with knowledge and skills in analysis of qualitative and quantitative data. It covers: definition of basic statistical concepts; descriptive statistics; data coding, summarizing and presentation techniques; analyzing, and drawing conclusions from data using both qualitative and quantitative research methods. Reporting research results to various audiences (academic, policy, management/practitioners, communities etc…); integrating qualitative and quantitative data. Students will be introduced to the use of computer and statistical software packages to analyze data sets.

**2. COURSE OBJECTIVES**

The course aims at stimulating the statistical mindset of students in an effort to model a graduate with a holistic approach to data analysis using both qualitative and quantitative analytical tools in real life situations.

The **specific objectives** are to:

1. provide students with general knowledge about the basic theories and concepts of qualitative and quantitative data analysis procedures;
2. introduce students to the various types of statistical procedures (qualitative and quantitative) , their appropriateness and applicability in real life situations;
3. equip students computer data analysis and interpretation skills to competitively write research reports and publication for both donor communities and academic purposes; and
4. enable students to apply and integrate various qualitative and quantitative data analysis procedures in real life situations.

**3. RECOMMENDED REFERENCES FOR READING**

1. Amin, M.E. (2004). *Foundations of Statistical Inference for Social Science Research.*MakerereUniversity. MakerereUniversity Printery. (Available in the School of Education)
2. Coffey, A., Holbrook, B. & Atkinson, P (1996). *Qualitative Data Analysis: Technologies and Representations.* Sage Publications, Thousand OaksCalifornia. Available at, [http://www.socresonline.org.}k/socresonline/1/1/4.html](http://www.socresonline.org.uk/socresonline/1/1/4.html)
3. Erickson, B.H. & Nosanchuk, T.A. 1992. *Understanding Data*. Second Edition. Toronto: University of Toronto Press.
4. Hopkins, K.D., Hopkins, B.R., & Glass, G.V. (1996). *Basic Statistics for the Behavioral Sciences.* Allyn & Bacon, A Simon & Schuster Company, Needham Heights, MA02194 (Available in the Departmental Library, Department of Agricultural Extension Education).
5. Impact Aósessment Centre (n.d). *Qualitative Methods/Quantitative Statistical Methods.* Available at, [http://www*.*microfinancegateway.org](http://www.microfinancegateway.org)
6. International Statistical Institute (n.d.). *Free Statistical Tools on the Web.* Available at, [http://www*.*](http://www.)isi.cbs.nl/FreeTool.htm

**4. COURSE CONTENT, METHODS OF INSTRUCTION, TOOLS AND EQUIPMENT REQUIRED**

|  |  |  |  |
| --- | --- | --- | --- |
| **TOPIC** | **CONTENT** | **METHOD OF INSTRUCTION / Time allocated** | **TOOLS / EQUIPMENT NEEDED** |
| 1. Introduction to Statistics
 | * Discussion of class overview
* Definition of statistics
* Types of statistics
* Major differences between descriptive and inferential statistics
* Basic Terminology in Statistics
 | Interactive Lectures (2hrs)Tutorial sessions (2hrs) | Flash cards, Markers White Board, Laptop, LCD Projectors, Paper  |
| 1. Classification of research variables
 | * Major classification of research variables
1. Quantitative and Qualitative variables
2. Continuous and Discrete variables
3. Independent and Dependent variables
* Other classification of research variables
1. Extraneous research variables
2. Active research variables
3. Attribute research variables
4. Manipulated research variables
 | Interactive Lectures (2hrs)Tutorial sessions (2hrs) | Flash cards, Markers White Board, Laptop, LCD Projectors, Paper |
| 1. Scales of measurement of research variables
 | * Nominal Scale of measurement
* Ordinal Scale of measurement
* Interval Scale of measurement
* Ratio Scale of measurement
 |  Interactive Lectures (2hrs)Tutorial sessions (2hrs) |  Markers White Board, Laptop, LCD ProjectorsPaper |
| 1. Introduction to the Statistical Package for Social Scientists (SPSS)
 | * Historical overview of SPSS
* Entering Data into SPSS
* Variable properties and description
* Using the output viewer
* Importing data sets from external files
* Variable manipulation and transformation
 | Interactive Lecture (2hrs)Computer laboratory (2hrs) | Markers White Board, Laptop, LCD Projector, Desktop computersSPSS software |
| 1. Measures of Central Tendencies as Data Analysis Tools
 | * Measures of central tendencies as Data Analysis Tools
* Measures of central tendencies defined
* Types of measures of central tendencies
1. The mean
2. The mode
3. The median
 | Interactive Lecture (2hrs)Computer laboratory (2hrs) | Markers White Board, Laptop, LCD Projector, Desktop computersSPSS software |
| 1. Interpretation of Data using measures of central tendencies
 | * Major Differences between the different measures of tendencies
* Using the different measures of central tendency to interpret data
* How to choose an appropriate measure of central tendency
* Pros and cons of the different measures of central tendency
 | Interactive Lecture (2hrs)Tutorial session (2hrs) | Markers White Board, Laptop, LCD Projector |
| 1. Data Analysis Tools
 | * Measures of Central Tendency and Population Distribution Patterns
* Types of Distributions
1. Normal Distributions
2. Skewed Distributions
3. Bimodal Distributions
4. Unimodal Distributions
 | Interactive Lectures (2hrs)Computer Laboratories (2hrs)Independent study (3hrs) | Markers White Board, Laptop, LCD Projector, Desktop computersSPSS software |
| 1. Measures of Variability as Data Analysis Tools
 | * Measures of variability as data analysis tools
* Measures of variability defined
* Types of measures of variability
1. Variance
2. Standard deviation
3. The range
4. The interquartile range
 | Interactive Lectures (2hrs)Computer Laboratories (2hrs) | Markers White Board, Laptop, LCD Projector, Desktop computersSPSS software |
| 1. Interpretation of Data using measures of dispersion
 | * Major Differences between the different measures of variability
* Using the different measures of variability to interpret data
* How to choose an appropriate measure of variability
* Pros and cons of the different measures of variability
 | Interactive Lecture (2hrs)Tutorial session (2hrs) | Markers White Board, Laptop, LCD Projector |
| 1. Data Management in Statistical Analyses
 | * Introduction to Data management practices
* Rationale for Data management in research studies
* Spread sheet data entry and organization
* Limitation of using data spreadsheets
* Screening and cleaning data
 | Interactive Lecture (2hrs)Tutorial session (2hrs) | Markers White Board, Laptop, LCD Projector |
| 1. Processing of Data for Analysis
 | * Introduction to SPSS
* Data validation and checking techniques
* Data manipulation techniques
* Role of the research in process data
 | Interactive Lecture (2hrs)Computer Laboratory (2hrs) | Markers White Board, Laptop, LCD Projector, Desktop computersSPSS software |
| 1. Using tables to Organize and summarize quantitative Data
 | * Introduction to Data coding, screening and cleaning
* Categories of Tables
* Characteristics of good tables
* Types of statistical tables
1. Frequency tables
2. Relative frequency tables
3. Cumulative frequency tables

Interpretation of data using the various table formats | Interactive Lectures (2hrs)Computer Laboratories (2hrs) | Markers White Board, Laptop, LCD Projector, Desktop computersSPSS software |
| 1. Using graphs to Organize and summarize quantitative Data
 | * Rationale for using graphs to present quantitative data
* General characteristics of good graphs
* Types of graphs
1. Histograms
2. Bar graphs
3. Line graphs
4. Pie charts
* Interpretation of data using the various graph formats
 | Interactive Lectures (2hrs)Computer Laboratories (2hrs) | Markers White Board, Laptop, LCD Projector, Desktop computersSPSS software |
| 1. Analysis of Qualitative Data
 | * What is Qualitative Data?
* Approaches to Analyzing Qualitative Data
* Framework for Qualitative Data Analysis
 | Interactive Lectures (2hrs)Tutorial session (2hrs) | Markers White Board, Laptop, LCD Projector |
| 1. Integrating quantitative and qualitative data
 | * Qualitative and Quantitative Data Analysis: Pros and Cons
* The need to Integrate Qualitative and Quantitative Data Analysis Approaches
 | Interactive Lectures (2hrs)Tutorial Sessions (2hrs) | Markers White Board, Laptop, LCD Projector,  |

**5. SUMMARY OF TIME NEEDED**

Interactive lectures covering theory 30 hrs

Tutorial Hours 12 hrs

Computer Laboratories 18 hrs

**6. OVERALL COURSE EVALUATION**

Continuous Assessment Test 20%

Take Home and Computer Laboratory assignment 20%

Final examination 60%.