

**North Carolina Central University, Durham**

**School of Education**

**Department of Curriculum & Instruction**

**Introduction to Statistical Methods in Education**

**(EDGR 5910-01, 3 Credit Hours)**

**GRADUATE COURSE SYLLABUS (SPRING 2023)**

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**Office Hours**: Monday thru Wednesday, 4 – 6:30pm.

**NCCU ACADEMIC INTEGRITY POLICY**

All students should be aware that the Department of Curriculum and Instruction takes the University Policy on Academic Integrity at NCCU very seriously.

Details regarding academic integrity can be found in Undergraduate Students Code of Academic Integrity and Graduate Academic Integrity Policy and these policies will be enforced in this course. It is your responsibility to read the codes. As a center of learning, teaching, and research, the North Carolina Central University charges its members, including students, to maintain patterns of behavior that enable the stated essential functions.

Academic Dishonesty Defined

Academic dishonesty is defined as any conduct that is intended by the student to obtain for him/her or for others an unfair or false evaluation in connection with any examination or other work for academic credit. Cheating, fabrication, plagiarism, and complicity are examples of conduct that is academically dishonest.

Cheating is the unauthorized use of materials in connection with an examination or other work for academic credit, including, but not limited to:

* The use of books, notes, outlines, etc. during an examination where the instructor has not authorized use of such materials or information;
* Seeking unauthorized materials or information from others in connection with an examination;
* Giving or attempting to give unauthorized assistance to another person in connection with an examination;
* Obtaining or attempting to obtain unauthorized copies of examinations; • Copying or attempting to copy from the work of another student during an examination;
* Bringing to an examination, or attempting to use during an examination, unauthorized answers prepared prior to the examination; and
* Submitting for evaluation in a course, part or the whole of a work for which credit has been given previously.

Fabrication is the invention, counterfeiting and/or alteration of quoted passages, data, procedures, experiments, sources or other information in connection with any academic exercise.

Plagiarism is the use of the ideas, words, or works of another without attribution when the information provided is not common knowledge either in content or form and includes, but is not limited to:

− Quoting from the published or unpublished work of another without appropriate attribution;

− Paraphrasing or summarizing in one’s own work any portion of the published or unpublished materials of another without attribution; and

− Borrowing from another’s work, data, and facts which are not in the domain of common knowledge.

Complicity is the giving of assistance or the attempt to give assistance to another for the purpose of perpetrating academic dishonesty.

**Adverse Weather**

Read <http://www.nccu.edu/health-safety/emergency/adverseweather.cfm> for the University’s policy on adverse weather and follow the instructions as outlined in the University policy. In addition, announcements regarding scheduled delays or the closing of the university due to adverse weather conditions will be broadcast on local radio and television stations.

**Course Description**

The Introduction to Statistical Methods in Education (EDGR 5910-101) is a graduate-level course in applied statistics applicable to education and the social sciences. In this course, I will introduce the basic concepts of statistical analysis, with a focus on both univariate and bivariate data. The course starts with an introduction to statistics terms and then moves on to organization and display of data. Analysis of univariate data by way of measures of central tendency (such as the mean or average), dispersion (such as the variance), and asymmetry ("skewness") is presented next, followed by an introduction to probability theory.

The relationship of probability to statistics is also discussed, providing students with the tools they need to understand how "chance" plays a role in statistical analysis. Statistical distributions, with a focus on the normal distribution and its uses, are also considered, along with a discussion of bivariate data and linear (least-squares) regression. Finally, the course culminates with a low-level introduction to hypothesis testing. Although this last topic could be a course of its own, the student is provided with enough theory and sufficient practice to conduct analyses of simple statistical hypotheses.

Students will be guided in a systematic process to compile, analyze, and interpret data resulting in a simple research paper. The course will prepare candidates to use statistical tools for making data-based decisions.

The course assumes a minimal understanding of algebra, but many of the concepts can be understood, and even many of the calculations performed, without an extensive mathematical background. This course is designed for anyone who wants a little more than just a cursory overview of statistics, but who does not want to get bogged down in the mathematical theory that underlies it.

**Student Learning Outcomes**

Upon successful completion of this course, the student will be able to:

1. Demonstrate understanding of various statistical concepts and methods for summarizing and displaying data.
2. Compute frequencies, central tendency, variability, probability, z-score, t-tests (the one sample, two independent samples, and two related samples), correlations, Regression, and chi-Square.
3. Demonstrate knowledge of basic probability and statistical inference.
4. Align research questions with the appropriate statistical procedure.
5. Analyze data using the computer software and make data-based decisions.

**Course Assessment**

The assessment tools used will include bi-weekly homework and in-class assignments, mid-term exam, a comprehensive/cumulative final exam, and

the capstone project (Research Paper).

**Grading Policy**

The final grade in this course will be determined as follows:

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| --- | --- |
| Homework Assignments (3) | 15% |
| Quizzes (2) | 10% |
| Mid-term Exam | 25% |
| Final Exam | 25% |
| Capstone Project (Research Paper) | 25% |

Your final letter grade will be based on the following tentative curve:

|  |  |
| --- | --- |
| A | 90 -100 |
| B+ | 85 - 89 |
| B | 80 - 84 |
| C+ | 75 - 79 |
| C | 60 - 74 |
| F | 0 - 59 |

**Attendance Policy:**

* Attendance at all classes will be recorded and is mandatory.

**A Brief Note**

People generally, and even students, say a lot of disparaging things about statistics. A good number of them believe that “you can prove anything with Statistics.” They will disregard a claim, even when based on data, as “just a statistical trick.” To be sure, Statistics has often been used to mislead the unsuspecting public in various contexts, and this has brought some notoriety.

This perception of Statistics is also widespread among college students and they generally, do not find the subject exciting neither do they see it as fun. On the contrary, Statistics can be fun, regardless of what people say on the street. Even though Statistics does not get the respect it deserves, it helps us to think clearly with data. Take it from me (your latest friend) a little practice thinking statistically is all one needs to start seeing the world more clearly and accurately.

Anyhow, statistics is a tool that, if used properly, can be of tremendous help in education, math, science, engineering, history, politics, and numerous other fields. As you study Statistics, always remember that it is more than just math: which simply involves the manipulation of numbers through addition, subtraction, multiplication, division, and other mathematical operations. It also involves language and units: when a statistician provides a statistic, it involves a number and a label of some sort. For instance, the number $24,500 is not in and of itself a statistical value; "an average salary of $24, 500," however, is a statistical value.

This linguistic aspect of statistics sometimes allows a certain amount of ambiguity that can be misleading. As I assured you earlier, the study of statistics will equip all of you to identify and understand both uses and abuses of this tool. My hope is that each and every one of you would find the subject interesting and useful beyond the mathematical skills that it imparts and become part of a vanguard defending against attempts by the unscrupulous to mislead others.

**Chinasa Ukpabi, Ph.D.**

**COURSE OUTLINE**

|  |  |  |  |
| --- | --- | --- | --- |
| **WEEKS** | **TOPICS** | **COURSE ACTIVITIES** | **ASSIGNMENTS & DUE DATES** |
| **WEEK 1**  Period 1  Period 2 | Greetings, small talks, and pre-course teasers.  Introduction to Statistics | -Personal Introductions (Getting to know one another).  -Introducing the Syllabus and relevant Technology.  -General Course Description.  Basic concepts of statistical analysis, with a focus on both univariate and bivariate data | **Discussion of Capstone Project (The Research Process)** |
| **WEEK 2**  Period 3  Period 4 | Organization and display of data  Measures of Central Tendency | Frequency Distributions  Mean, Median, and Mode | **QUIZ**  **Updates on Research Paper (Choosing a Researchable Topic & Crafting a Research Problem)** |
| **WEEK 3**  Period 5  Period 6 | Measures of Dispersion  Statistical Distributions | -Variance, Standard Deviation, Range, Mean, Absolute Deviation.  -Skewness (Asymmetry)  -Normal Distributions  -Understanding z-scores  -Z-score statistics | **Assignment for Weeks 1, 2, 3 and 4 Due next class** |
| **WEEK 4**  Period 7  Period 8 | Probability Theory  Probability and Samples | Introduction to Probability Theory-Basic Concepts  Distribution of Sampling Means |  |
| **WEEK 5**  Period 9  Period 10 | Hypothesis Testing  Hypothesis Testing (contd.) | Introduction to Hypothesis Testing in Statistics  Formulating Hypothesis | **QUIZ**  **Updates on Research Paper (Research Question/Hypothesis)** |
| **WEEK 6**  Period 11  Period 12 | The t-Statistic  The t-Statistic (contd.) | -Introducing the t-Statistic  -The t-test for Two Independent Samples  -The t-test for Two Related Samples | **Assignment for Weeks 5 and 6 Due next class** |
| **WEEK 7**  Period 13  Period 14 | **REVISION**  **MID-TERM** | **REVISION**  **MID-TERM** | **Updates on Research Paper (General Issues)**  **MID-TERM** |
| **WEEK 8**  Period 15  Period 16 | Analysis of Variance-ANOVA    ANOVA (contd.) | Introduction to ANOVA  One-Way ANOVA in SPSS |  |
| **WEEK 9**  Periods  17 & 18 | Analysis of Variance (contd.) | -Repeated Measures ANOVA  -Two-Factor Analysis of Variance | **QUIZ** |
| **WEEK 10**  Periods  19 & 20 | Correlation Analysis | -Understanding Correlation and its calculation  -Using SPSS | **Updates on Research Paper (Data Analysis, Findings)** |
| **WEEK 11**  Periods  21 & 22 | Regression Analysis | -Introduction to Regression Analysis  -Calculating the Pearson R.  -Using SPSS | **Assignment for Weeks 7, 8,9, 10, 11, & 12 Due next class** |
| **WEEK 12**  Periods  23 & 24 | The Chi-Square | -Introduction to Chi-Square  -Tests for Goodness of Fit and Independence |  |
| **WEEK 13**  Periods  25 & 26 | **REVISION** | **REVISION** | **Updates on Research Paper (Data Analysis, Findings, and Conclusions)** |
| **WEEK 14**  Period 27  Period 28 | **FINAL EXAM**  **Updates on Research Paper (General Review)** | **FINAL EXAM**  **Updates on Research Paper (General Review)** | **FINAL EXAM**  **Updates on Research Paper (General Review)** |
| **WEEK 15**  Period 29  Period 30 | **Updates on Research Paper (General Review)**  **Submission of Research Paper** | **Updates on Research Paper (General Review)**  **Submission of Research Paper** | **Updates on Research Paper (General Review)**  **Submission of Research Paper** |