1. Course Prefix and Number: EDA 7930

2. Course Title: Special Topics in Educational Research: Statistical Analysis for Educational Research II

3. Course Prerequisites: None

4. Instructor: Ghazwan Lutfi, Ph.D.
   Office: 201B GEC – B
   Telephone: (850) 559-8511
   E-mail: Ghazwan.Lutfi@famu.edu
   Office Hours: Monday 10:00 a.m.-2:00 p.m. Thursday, 10:00 a.m.-1:00 p.m. Wednesday, 10:00 a.m. - 1:00 p.m.; and other times by appointment.

   Coordinator of Administrative Services: Mrs. Melinda Norton
   599-3191

5. Required Textbooks and Readings:


6. Course Purpose: The primary purpose of this course is to help the students gain an understanding of the logic, concepts, methods, application, and limitations of the analysis of variance (ANOVA), analysis of covariance (ANCOVA), and other multivariate analysis. The emphasis will be on methods and applications most frequently encountered in social science research, especially in the field of education. Computer applications of the methods and procedures will be integrated into the course.

   The successful completion of the course requirements is expected to result in increased ability to (a) compute and apply basic descriptive and inferential statistics to real sets of data, (b) intelligently read and evaluate research literature, (c) recognize the strengths and limitations of statistical analysis in the conduct of disciplined inquiry, and (d) communicate with peers and other professionals on research issues.
7. Conceptual Framework: The Conceptual Framework in the Professional Education Unit at Florida A&M University’s College of Education is an integrated approach to providing educational experiences that result in exemplary professional educators. The Framework is comprised of several activities and themes with the mission of developing high quality classroom teachers, administrators and support personnel. The term “exemplary” refers to the kind of graduates the unit strives to produce. The Educational Leadership Program has identified the professional content and experiences of the Educator Accomplished Practices specified by the Florida Standards Commission, the Florida Essential Teaching Competencies identified by the Florida Department of Education, the competencies and domains identified by the Florida Council for Educational Management and the standards identified by the National Council for the Accreditation of Teacher Education. Figure 1 provides a diagram of the Exemplary Professional Conceptual Framework.

![Exemplary Professional Conceptual Framework](image)

Figure 1. Exemplary Professional Conceptual Framework

8. NCATE Curriculum Guidelines: NCATE established standards that professional educators should meet. The second standard, Information Management and Evaluation, contains two substandards that are applicable to EDA 7930. The third standard, Curriculum, Instruction, Supervision, and the Learning Environment, contains one substandard that is applicable to EDA 7930. Specifically, the substandards relative to EDA 7930 are as follows:

**Substandard 1.7** Manifest a professional code of ethics.

**Substandard 2.2** Use qualitative and quantitative data to inform decisions, to plan and assess school programs, to design accountability systems, to plan for school improvement, and to develop and conduct research.
Substandard 2.4 Analyze and interpret educational data, issues, and trends for board committees, and other groups, outlining possible outcomes and their implications.

Substandard 3.9 Assess student progress using a variety of applied techniques.

9. Course Objectives: Students that successfully complete all course requirements should be able to:

a. Select, apply, and interpret the results of appropriate ANOVA models for given data situations;
b. Select, apply, and interpret the results of appropriate follow-up analysis procedures subsequent to ANOVA;
c. Use a packaged statistical program to perform selected statistical analyses.
d. Apply and interpret the results of ANCOVA models in appropriate data situation.
e. Select, apply, and interpret the results of appropriate non-parametric (Chi-square & categorical data analysis) in given data situations.

10. Teaching methods: Depending upon the course material covered during class, students may expect practical hands-on class exercises, discussions among class members and the teacher, and lectures by the instructor. Discussions will focus upon the appropriate chapter or chapters in the required textbooks, handouts, and other assigned readings. The students should read all assigned materials in advance of the class period for which it is assigned.

Three homework assignments (either paper-and-pencil or computer assignments) will be collected and graded during the semester.

In addition, students will complete two written assignments outside of class. The paper review of a published research article in his or her field, in which at least one statistical hypothesis is tested, and the empirical research project, including the calculation of relevant statistics and an interpretation of the results.
## 11. Course Outline:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic(s)</th>
<th>Reading Assignments</th>
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</thead>
<tbody>
<tr>
<td>May 14</td>
<td>Course overview</td>
<td>GH, chapters 1-5</td>
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<td></td>
<td>Variables and Measurement</td>
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<td>Inferential Statistics</td>
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<td></td>
<td>Introduction to SPSS for Window</td>
<td>S1, chapter 1</td>
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<td>May 21</td>
<td>Hypothesis Testing One-Way</td>
<td>GH, chapters 11, 12, &amp; 15</td>
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<td></td>
<td>Analysis of Variance</td>
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<tr>
<td>May 28</td>
<td>ANOVA assumptions, &amp; Pre &amp; post hoc</td>
<td>GH, chapters 16, &amp; 17</td>
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<td>means comparisons</td>
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<td>June 4</td>
<td>Two &amp; three-way ANOVA</td>
<td>GH, chapters 18</td>
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<td></td>
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<td>S1, chapter 4</td>
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<td></td>
<td></td>
<td>S2, chapter 8</td>
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<tr>
<td>June 11</td>
<td>Continue- Two &amp; three-way ANOVA</td>
<td>GH, chapters 18</td>
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<tr>
<td></td>
<td></td>
<td>S1, chapter 4</td>
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<td>S2, chapter 8</td>
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<td>June 18</td>
<td><strong>Midterm Examination</strong></td>
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<td>June 25</td>
<td>ANOVA design- random, mixed, &amp; fixed effects</td>
<td>GH, chapter 19</td>
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<td>July 2</td>
<td>Repeated measures ANOVA</td>
<td>GH, chapter 20</td>
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<td>S1, chapter 5</td>
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<tr>
<td>July 9</td>
<td>Analysis of covariance (ANCOVA)</td>
<td>GH, Chapter 21</td>
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<td></td>
<td>Paper review is due</td>
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<td></td>
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<td>S1, chapter 7</td>
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<tr>
<td></td>
<td></td>
<td>S2, chapter 9</td>
</tr>
<tr>
<td>July 16</td>
<td>Chi-square &amp; categorical data analysis</td>
<td>GH, Chapter 13</td>
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<tr>
<td></td>
<td></td>
<td>S2, chapter 14</td>
</tr>
<tr>
<td>July 23</td>
<td>MONOVA &amp; other Multivariate analysis</td>
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<td></td>
<td>Research project</td>
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<tr>
<td>July 30</td>
<td><strong>Final Examination</strong></td>
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*Note.* GH – Glass and Hopkins; S1- Stevens Intermediate, and S2 –Stevens Multivariate;
12. Criteria for Evaluation of Student Performance: Students are to complete the reading assignments in the textbook and any supplementary readings prior to the class session. Basic familiarity with the material increases learning in the classroom. Students must attend every class session. A conference with the instructor is required if a student misses a class. A class absence will result in a letter grade reduction for the course. If circumstances occur that require you to miss a class session, the instructor requests an e-mail or phone message prior to the class session. Absence from class on an assignment’s due date is NOT an acceptable excuse for late work. Any assignment turned in after collection of the assignment at the beginning of the class on the specified due date will receive a letter grade reduction. The assigned grade may be reduced one letter grade per day late.

The final course grade will be computed as a weighted combination of (a) homework, (b) article review, (c) mini-research project, and (d) examinations. The assigned weights are:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10.0%</td>
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<tr>
<td>Article review</td>
<td>10.0%</td>
</tr>
<tr>
<td>Midterm examination</td>
<td>30.0%</td>
</tr>
<tr>
<td>Research project</td>
<td>20.0%</td>
</tr>
<tr>
<td>Final examination</td>
<td>30.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0%</td>
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</tbody>
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The student’s percentage score on each assignment is multiplied by the appropriate assigned weight and then summed across all assignments. The summed value is divided by the number of assignments to yield the student’s final course percentage. Final grades are assigned based on a 10 point grading scale; A - 100% - 90%, B - 89% - 80%, C - 79% - 70%, D - 69% - 60%, and F - 59% and below. A grade of “I” only is assigned in the case of a student who is making reasonable progress toward successful completion of the course and who, for unforeseen circumstances, is unable to complete all assignments and examinations by the end of the semester.

The homework assignments (either paper-and-pencil or computer assignments) will be collected and graded during the semester. These assignments will contribute 10% of the final grade.

The instructor will comment and assign a letter grade to the research article review report. Submit the assignment using APA style. The instructor considers spelling, punctuation, and grammar when grading assignments.

Submit the mini-research projects following the APA style. The instructor considers spelling, punctuation, and grammar when grading projects.

The examinations are objective in nature and may include multiple-choice items, matching items, short response items, extended response items, and statistical problems to calculate. Students may NOT use books, notes, and other reference materials during examinations. However, electronic calculators are permitted during examinations. Each student should bring one or two #2 pencils to each examination.
13. Outline for the article review

Each student is required to locate one published article in his or her field in which at least one statistical hypothesis is tested. (Be sure that the statistics employed are those that have been covered in this class.) The most likely sources are periodicals that specialize in the publication of research findings. The date of publication must be within the past five years. Please submit a copy of the article together with the review. Articles selected should be rather brief (about 5-10 pages), but complete in their treatment of the research problem.

No page limit is imposed upon the length of the review, but most studies can be analyzed within two to three typewritten pages. Provide an APA style reference for the study at the top of page one. The purpose of the evaluation is to comment upon the adequacy of the article as a research report by analyzing each component of the study methodology and statistical design. Point out any errors or poor procedures you detect, as well as strengths or desirable procedures. Use the outline below as a guide in your analysis. Prepare the critical analysis on one side of letter size paper (8.5" x 11"). Staple it in the upper left-hand corner.

Items to Include in the Review
1. APA style reference
2. Title
3. Identify the primary research question(s) being investigated and/or research hypotheses tested.
4. Identify the independent variable(s) (if any). Classify the independent variable according to these criteria:
   a. active(manipulated) or assigned(attribute).
   b. quantitative or qualitative.
   c. fixed or random.
   d. between-subjects or within-subjects
   e. crossed or nested.
5. Identify the dependent variable(s) (if any).
6. Identify methods by which confounding variables are controlled, i.e. physical, selective, or statistical (if any).
7. Specify the unit of analysis used in the study. Is the unit appropriate?
8. Identify the statistical procedure(s) employed and the null hypotheses tested. Is/are the assumption(s) of the statistical test met or not? Explain.
9. Identify the result(s) of the statistical test(s) (reject or fail-to reject).
10. Briefly state the substantive conclusion supported by the design and analysis.
11. Any suggestion(s) to improve the study design.

14. Outline for the small empirical research project

The mini-empirical research project will include the calculation of relevant statistics and an interpretation of the results. The purpose of this project is to allow you to apply the statistical methods we have examined to data of interest to you. The project requirements are to

1. Select a research question of interest to you from a data base file;
2. Propose a method to answer the research question, including sampling, instrumentation, procedures, and statistical analysis;
3. Calculate and interpret the relevant statistics (Check assumptions of the statistical test you select); and
4. Provide a brief written report of the project.
5. Attached a copy of the SPSS output, syntax, and the data file disk.
References


