Applied Data Analysis and Interpretation in Agriculture and Natural Resources

Course No.: AEC 6932  
Instructor: Dr. Glenn D. Israel

Section No.:  
Office Hours: Monday, 2:30-4:30 pm or by appointment

Term: Spring, 2020  
Office: 218 Rolfs Hall

Location: 306 Rolfs  
E-mail: gdisrael@ufl.edu

Time: Thursday, at 1:55 – 4:55 p.m.  
Telephone: 273-2586 (office)
Inform instructor about religious holidays

339-6429 (cell)

Course Description:
Concepts and methods drawn from the social sciences for analyzing data in the human dimensions of agricultural and natural resource issues.

Course Objectives:
Upon completing the course, students should be able to identify a research question and conduct a process analyzing a data set using quantitative methods. Specifically, students should be able to:

1. Determine appropriate statistical techniques for a given research question and data set.
2. Conduct exploratory analyses to assess data quality and describe distributions of variables.
3. Implement data reduction strategies and assess measurement properties of constructs.
4. Conduct bi-variate analyses using tabular analysis, correlation and other methods.
5. Conduct multi-variate analyses using General Linear Model techniques (Manova, Mancova, Regression) or Log-Linear Models.
6. If appropriate, conduct an analysis using structural equation models or hierarchal linear models.
7. Prepare a report of the methods and results which is suitable for publication.

Text:
There is no require text for the course. Instead students are expected to retrieve and read online journal articles listed below. In addition, each student should obtain a copy of SAS or SPSS statistical software (the instructor uses SAS and SPSS) for his or her personal computer.

Students may wish to purchase the following book as a supplemental reference for the course:

Preparation:
Students should have completed STA 6126 and 6127 (or equivalent) and a research methods course. An additional course on regression also is helpful.

Participation:
In addition to attending each class, you should read assigned articles in a timely manner. Given the nature of the course, students are expected to participate in discussions for all scheduled classes.

Assignments:
1. Proposed project for the semester. Provide title and one paragraph description of the research question and data to be used in the analysis. 50 pts
2. Meta-data report 50 pts
3. Imputation of missing data exercise. Select an imputation method, impute missing data and include syntax and output. 100 pts
4. Index construction exercise 50 pts
5. Descriptive analysis. Conduct appropriate descriptive analysis of variables in data set. Include syntax and output in an appendix. Draft table(s) for publication 100 pts
6. First draft of publication, including an appendix with output and syntax used in the analysis 100 pts
7. Regression/Analysis of Covariance exercise 50 pts
8. Logistic regression exercise 50 pts
9. Second draft of publication, including an appendix with output and syntax used in the analysis 100 pts
10. HLM exercise 50 pts
11. Student participation and oral report 100 pts
12. Final draft of publication, including an appendix with output and syntax used in the analysis 200 pts

Grading: Based on the project assignments and final report, the grade for the course will use the following scale:

A   = 930 - 1,000 pts.      C   = 730 - 769
A-  = 900 - 929            C-  = 700 - 729
B+  = 870 - 899            D+  = 670 - 699
B   = 830 - 869            D   = 630 - 669
B-  = 800 - 829            E   = 629 or fewer pts.
C+  = 770 - 799
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings for class</th>
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<tbody>
<tr>
<td>Jan. 9</td>
<td>Introduction and Research question selection</td>
<td>1, 2, 3</td>
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<td></td>
<td>Exploring data structures &amp; descriptive statistics, inc. nested data</td>
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<td>Jan. 16</td>
<td>Assessing Bias in survey data</td>
<td>4 (Project abstract due)</td>
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<td>Using plots and graphs/Descriptive statistics</td>
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<tr>
<td>Jan. 23</td>
<td>Dealing with missing data: Imputation methods</td>
<td>5, 6, 7 (Meta-data report due 1/23)</td>
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<td>Jan. 30</td>
<td>Measurement issues: index construction with Principle components;</td>
<td>(Imputation exercise due 1/30)</td>
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<td>Indexes cont.: Factor analysis</td>
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<td>Feb. 6</td>
<td>Tabular analysis</td>
<td>8</td>
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<td>Moderator/Mediator variables</td>
<td>9, 10 (Index exercise due 2/6)</td>
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<td>Feb. 13</td>
<td>Survey weighting</td>
<td>(Table(s) with descriptive analysis due 2/13)</td>
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<td>Feb. 20</td>
<td>No class – Israel to WERA-1010</td>
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<td>Feb. 27</td>
<td>Regression</td>
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<td>Mar. 5</td>
<td>No class – Spring break</td>
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<td>Mar. 12</td>
<td>Dummy variables in regression</td>
<td>11 (1st draft of paper due)</td>
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<td>ANOVA &amp; MANCOVA</td>
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<td>Mar. 19</td>
<td>Regression diagnostics; Collinearity assessment</td>
<td>12, 13</td>
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<td>Logistic regression</td>
<td>(Regression exercise due 3/19)</td>
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<td>Mar. 26</td>
<td>Logistic regression (cont.)</td>
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<td>Apr. 2</td>
<td>Ordinal &amp; multinominal logistic regression; Poisson regression</td>
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<td>Student updates</td>
<td>Logistic regression exercise due 4/2</td>
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<td>Apr. 9</td>
<td>Effect size calculations</td>
<td>14, 15 (2nd draft of paper due 4/16)</td>
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<td>Student updates</td>
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<td>Apr. 16</td>
<td>Hierarchal Linear Models (HLM): Two-level models</td>
<td>16</td>
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<td>HLM: Three-level models, Growth models</td>
<td>17, 18 (HLM exercise due)</td>
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<td>Intro to Structural equation models (SEM)</td>
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<td>Apr. 23</td>
<td>Final paper due</td>
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Reading Assignments:


(19) TBD on the topic of structural equation models

Additional References:


(22) Savvy Survey Series. Available at: http://edis.ifas.ufl.edu/topic_series_savvy_survey
Data sets available from the instructor for the Course Project (and related publications):

1. Student-supplied, instructor-approved data sets

2. Small Farms Survey data, 1989


3. Small Farms Survey data, 2008 (n=275)


5. Florida Horse Owner Survey, 2005 (n=615)


7. Florida Yards & Neighborhoods evaluations, 1999-2004, 2010-12 (n=400+; n=480+)


8. NELS:88 public use data, Base year – third follow-up (n~20,000)


9. HSLS:09 public use data (High School Longitudinal Study of 2009), Ninth grade through 3 years after HS (2016), [https://nces.ed.gov/surveys/hsls09/](https://nces.ed.gov/surveys/hsls09/), (n=23,000+ students, 944 schools)


11. Climate Change in Florida, 2016-2017 (Qualtrics online panel, n=514; ABS mail survey, n=318)

Note: use of any data set must comply with University of Florida policies concerning research involving human subjects.

**Relevant Websites:**

Very useful web site with examples and syntax for multivariate analysis:
[https://stats.idre.ucla.edu/](https://stats.idre.ucla.edu/)
[https://stats.idre.ucla.edu/spss/](https://stats.idre.ucla.edu/spss/)
[https://stats.idre.ucla.edu/sas/](https://stats.idre.ucla.edu/sas/)

Statsoft Electronic Statistics Textbook

Web Pages that Perform Statistical Calculations
[http://statpages.org/](http://statpages.org/)
Grades and Grade Points
For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/.

Attendance and Make-Up Work
Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Online Course Evaluation Process
Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at: https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at: https://gatorevals.aa.ufl.edu/public-results/.

Academic Honesty
As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

Software Use:
All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Services for Students with Disabilities
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation 0001 Reid Hall, 352-392-8565, https://disability.ufl.edu/
Campus Helping Resources
Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university’s counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu
- Counseling Services
- Groups and Workshops
- Outreach and Consultation
- Self-Help Library
- Wellness Coaching

- U Matter We Care, www.umatter.ufl.edu/

- Career Connections Center, First Floor JWRU, 392-1601, https://career.ufl.edu/.

Student Complaints:
- Residential Course: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/
- Online Course: http://www.distance.ufl.edu/student-complaint-process