Course Information

Course Description
“This course examines the design and analysis of research involving more than one dependent variable. Topics will include multiple regression, MANOVA, and Factor analysis” – Riveting. I know.

Research design and analysis is a critical aspect of being a scientist; having a sound design and analyzing data correctly is more important than ever. While your first semester of graduate statistics tends to focus on univariate designs (designs and tests measuring 1 dependent variable), this second semester we are going to be focusing on how to run and analyze research questions/data with more than 1 dependent variable (hence, multivariate). Statistics is like a foreign language; the more you practice it, the more you will be able to use and understand it. We will be starting off with a review of univariate techniques (t-tests, ANOVAs, correlation, assumptions of tests, etc.) and then move into their multivariate extensions (multiple/canonical/logistic regression, ANCOVAs/MANOVAs, PCA/EFA, Survival Analysis, Discriminant analysis, and nonparametrics). Graduate students will be expected to be proficient in not only understanding different multivariate statistical techniques but also in discussing these techniques as they relate to research of others and their own. Students will lead a discussion on a chosen article’s multivariate methods/results section as well as analyze and write up a mock-data set.

Course Credits
3 credits

Prerequisite and Co-requisite Courses
PSY 6364 (Statistical design and research)
**Prerequisite Skills**
Accessing Internet websites, using ASU Library resources, and proficiency with Microsoft Word and/or PowerPoint are expectations of this course. Additionally, each student should download Jamovi software and should be familiar with how to operate it.

**Student Learning Outcomes**

<table>
<thead>
<tr>
<th>Student Learning Outcome</th>
<th>Assignment(s) or activity(ies) validating outcome achievement:</th>
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</thead>
<tbody>
<tr>
<td><strong>1) Gaining a basic understanding of the subject</strong> (e.g., factual knowledge, methods, principles, generalizations, theories)</td>
<td><strong>Weekly homework assignments</strong>&lt;br&gt;<strong>Exams</strong></td>
</tr>
<tr>
<td>a) To understand and be able to discriminate between various research methods and multivariate statistical tests used to collect and analyze data</td>
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<tr>
<td><strong>2) Learning to apply course material (to improve thinking, problem-solving, and decisions)</strong></td>
<td><strong>Weekly homework assignments</strong>&lt;br&gt;<strong>Exams</strong>&lt;br&gt;<strong>Final Project</strong></td>
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<tr>
<td>a) To apply knowledge of various multivariate techniques to analyze novel data sets</td>
<td></td>
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<tr>
<td><strong>3) Learning appropriate methods for collecting, analyzing, and interpreting numerical information</strong></td>
<td><strong>Weekly homework assignments</strong>&lt;br&gt;<strong>Exams</strong></td>
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<td>a) To develop skills required to be able to analyze and interpret datasets</td>
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<tr>
<td>b) Learning how to run various multivariate statistical tests and understanding how to interpret data, outcomes, and make appropriate decisions</td>
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**Course Delivery**
This is a face-to-face course with learning resources and supplemental materials posted in Blackboard.

**Required Texts and Materials**

**Technology Requirements**
To successfully complete this course, students need to download and install Jamovi onto their computers. Students will also need to be able to have access to a computer that can run SPSS statistical software.

**Topic Outline - subject to change at the Professor’s discretion**

<table>
<thead>
<tr>
<th>Wednesdays</th>
<th>Multivariate Statistics</th>
<th>4-6:50PM</th>
<th>Spring 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 15</td>
<td>Introduction; Basics Descriptives</td>
<td>Ch. 1-2</td>
<td></td>
</tr>
<tr>
<td>Jan 22</td>
<td>Assumptions, Normality Inspecting Data</td>
<td>Ch. 3, 6</td>
<td>Exam 1 Due Feb 5 (Start of Class)</td>
</tr>
<tr>
<td>Jan 29</td>
<td>ANOVA</td>
<td>Ch. 12</td>
<td>Exam 1 Due Feb 5 (Start of Class)</td>
</tr>
<tr>
<td>Feb 5</td>
<td>Factorial ANOVA</td>
<td>Ch. 14</td>
<td>Homework 2 Due (Assumptions, Data Inspection)</td>
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<tr>
<td>Feb 12</td>
<td>Repeated Measures ANOVA</td>
<td>Ch. 15</td>
<td>Homework 3 Due (ANOVA &amp; Factorials)</td>
</tr>
<tr>
<td>Feb 19</td>
<td>Mixed ANOVA</td>
<td>Ch. 16</td>
<td>Homework 4 Due (Repeated Measures ANOVA)</td>
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<tr>
<td>Feb 26</td>
<td>ANCOVA</td>
<td>Ch. 13</td>
<td>Homework 5 Due (Mixed ANOVA)</td>
</tr>
<tr>
<td>Mar 4</td>
<td>MANOVA and Discriminant Analysis</td>
<td>Ch. 17</td>
<td>Exam 2 Due March 18 (Start of Class)</td>
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<tr>
<td>Mar 11</td>
<td>No school - Spring Break</td>
<td></td>
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<tr>
<td>Mar 18</td>
<td>Regression Multiple Regression</td>
<td>Ch. 9</td>
<td>Homework 7 Due (MANOVA, Regression, &amp; Multiple Regression)</td>
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<tr>
<td>Mar 25</td>
<td>Logistic regression</td>
<td>Ch. 20</td>
<td></td>
</tr>
<tr>
<td>April 1</td>
<td>PCA and Factor Analysis</td>
<td>Ch. 18</td>
<td>Exam 3 Due April 8 (Start of Class)</td>
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<td></td>
<td>Homework 8 Due (Logistic Regression)</td>
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Communication

Faculty will respond to email and/or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

Written communication via email: All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

Grading

Evaluation and Grades
Course grades will be determined as indicated in the table below.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percent/Points of Total Grade</th>
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</thead>
<tbody>
<tr>
<td>Homework (10)</td>
<td>100</td>
</tr>
<tr>
<td>Exams (4)</td>
<td>400</td>
</tr>
<tr>
<td>Final Project</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>600 (100%)</td>
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</tbody>
</table>

Grading System
Course grades will be dependent upon completing course requirements and meeting the student learning outcomes.

The following grading scale is in use for this course:
A = 540-600 points (90 – 100%)
B = 480-539 points (80 – 89.83%)
C = 420-479 points (70 – 79.83%)
D = 360-419 points (60 – 69.83%)
Teaching Strategies
Students are expected to be “active learners.” It is a basic assumption of the instructor that students will be involved (beyond the materials and lectures presented in the course) discovering, processing, and applying the course information using peer-review journal articles, researching additional information and examples on the Internet, and discussing course material and clinical experiences with their peers.

Assignment and Activity Descriptions
*Please note: Rubrics for all assignments and activities are located at the end of this syllabus.

Homework
Each week, students will be given a homework assignment. These are meant to keep students engaged with the material they just learned, rather than completing a homework assignment that covers an entire unit/module. Students are given the assignment on Wednesdays and they are due the following Wednesday at the start of class. Each homework is worth 10 points and none can be dropped. Each assignment will consist of some form of multiple choice/true-false/data entry/data analysis/short answer questions. Each homework assignment is due at the beginning of class on their respective due dates (see above). A total of 100 points will be from homework.

Exams
Each unit will involve a take-home exam. Do not confuse take-home with easy. These exams are meant to allow students ample opportunity to work with data and draw appropriate conclusions. These exams must be printed out and will be due to me the following class period after they are assigned. (Exams will open up on Thursdays and will be due to me the following Thursday at 2PM). See the schedule below for all due dates. These are open-note and open-book, but not open-friend. If you are found to have cheated on an exam, you and the person you cheated from will receive zeros, no questions asked. There are 4 non-cumulative exams. The exams will each count for 50 points. A total of 200 points will be from exams.

Final Project
As a graduate student, you are no doubt familiar with collecting data with human and/or animal subjects. In lieu of a final exam, students will produce a mock data set that is suitable to being analyzed by multivariate methods. This data set can be related to what the student is studying OR it can be something of interest to the student. Students will then write a complete methods and results section, with graphs and statistics accompanying results. Components of this grade will involve: submission of the SPSS data set,
submission of graphs and figure captions, and a methods/results section in appropriate APA format. A detailed rubric will be provided on Blackboard. A total of 100 points will be from this final project.

Late Work or Missed Assignments Policy

**POLICY ON LATE OR MISSED ASSIGNMENTS**
Due dates and times for assignments are posted. Failure to submit your assignments on the assigned date will result in a ten percent deduction for each day after the posted deadline. No assignments will be accepted more than one week past the assigned due date.

General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- Angelo State University Student Handbook
- Angelo State University Catalog

Student Responsibility and Attendance

Each student is expected to arrive on time to each class and attend class regularly. Although attendance is not officially a part of the grade, exam scores will reflect a subpar attendance record. You all are graduate students and are expected to be in class each week (except in serious circumstances). Also, exams are due in person on their respective dates; if they are turned in late, a student will receive a penalty of 10% per day it’s late.

Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

The College of Health and Human Services adheres to the university’s Statement of Academic Integrity.

Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as

1 [https://www.angelo.edu/student-handbook/](https://www.angelo.edu/student-handbook/)
2 [https://www.angelo.edu/catalogs/](https://www.angelo.edu/catalogs/)
3 [https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php](https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php)
provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student’s responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the Student Disability Services website. The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford  
Director of Student Disability Services  
Office of Student Affairs  
325-942-2047  
dallas.swafford@angelo.edu  
Houston Harte University Center, Room 112

**Incomplete Grade Policy**

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 Grading Procedures for more information.

**Plagiarism**

Plagiarism is a serious topic covered in ASU’s Academic Integrity policy in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

In your final project, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

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4 [https://www.angelo.edu/services/disability-services/](https://www.angelo.edu/services/disability-services/)  
5 [https://www.angelo.edu/content/files/14197-op-1011-grading-procedures](https://www.angelo.edu/content/files/14197-op-1011-grading-procedures)  
6 [https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php](https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php)
Papers are subject to be evaluated for originality. Resources to help you understand this policy better are available at the ASU Writing Center.⁷

**Student Absence for Observance of Religious Holy Days**

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day⁸ for more information.

**Syllabus Changes**

The faculty member reserves the option to make changes as necessary to this syllabus and the course content. If changes become necessary during this course, I will notify students of such changes by email, course announcements and/or via a discussion board announcement. It is the student’s responsibility to look for such communications about the course on a daily basis.

**Title IX at Angelo State University**

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Boone, J.D. You may submit reports in the following manner:

Online: [www.angelo.edu/incident-form](http://www.angelo.edu/incident-form)
Face to face: Mayer Administration Building, Room 210
Phone: 325-942-2022
Email: michelle.boone@angelo.edu

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⁷ [https://www.angelo.edu/dept/writing_center/academic_honesty.php](https://www.angelo.edu/dept/writing_center/academic_honesty.php)
⁸ [https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of](https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of)
Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State’s policy please visit: www.angelo.edu/title-ix.

**Student Evaluation of Faculty and Course**

Students in all programs are given the opportunity to evaluate their courses and the faculty who teach them. Evaluations are most helpful when they are honest, fair, constructive, and pertinent to the class, clinical experience, or course. Faculty value student evaluations, and use student suggestions in making modifications in courses, labs and clinical experiences. Angelo State University uses the IDEA (Individual Development and Educational Assessment) system administered through Kansas State University for all course evaluations. The Office of Institutional Research and Assessment administers IDEA for the entire university, online and has established a policy whereby students can complete course evaluations free from coercion.