**Math 4400-001: Applied Multivariate Statistics**

**Time & Place:** 1:00 – 1:50 p.m. MWF in LA 006

**Instructor:** Xiaoyi Ji (Sherry) **Mailbox:** Faculty workroom

**Email:** [Xiaoyi.Ji@uvu.edu](mailto:Xiaoyi.Ji@uvu.edu) **Office:** LA 121V

**Phone:** 801-863-6057 **Office Hours:** MTTF 12:00-1:00 pm or by appointment

**Prerequisite**: Math 2050, Math 2270, and Math 4710 with a C or better, or equivalent.

**Text**: An introduction to Applied Multivariate Analysis with R by Brian Everitt. Springer (2011)

**Final Exam**: It is departmental policy to have final exams as stated in the spring 2017 Class Schedule. The final exam for this class is **Monday, May 3; 1:00 to 2:50pm.**

**Grading**: Your final grade for this course will be determined as followed: Homework 25%, three Tests 50%, and Final exam 25%.

**Course Topics**

* Identify and organize multivariate data
* Summary statistics for multivariate data
* multivariate data visualization
* principal components analysis
* Canonical correlation analysis
* Exploratory factor analysis
* Multidimensional scaling and correspondence analysis
* Cluster analysis
* Apply Multivariate Analysis of Variance

**Learning Objectives:** After completing the course, the student can ordinarily expect to be able to:

* Identify and understand the structure of multivariate data and be able to phrase the appropriate scientific questions in terms of parameters of interest.
* Understand the basic logic behind each method's construction.
* Understand the various assumptions needed for the various methodologies covered in the class and determine which multivariate methods are appropriate for a given situation.
* Implement analyses of these methods in a statistical software package and interpret the output for each of the methods.

**Homework, Tests, and Final Exam Policies**

Homework will be assigned often in class and due dates will be the following Monday, or Wednesday when Monday (Jan 16 and Feb 20) is holiday. Your homework, tests, and final exam must be done neatly and provide sufficient explanation. What's sufficient explanation? A good guide is to think about whether another student in the class who didn't know how to do this particular problem could understand your solution. Late homework assignments will not be accepted, unless the student obtains the permission of the instructor prior to homework being due.

There will be three mid-terms exams with 300 points each. Tentative Exam Dates are in the following:

Exam 1 – Feb. 2nd Exam 2 – Mar. 13th Exam 3 – Apr. 17th

It is school policy to have final exam as stated in the Spring 2017 Class Schedule without taking a final exam early. **Final exam** is in class with 150 credits. Failure to take the final exam will result in a grade of UW or E for the course regardless of other grades.

**Computing**

Use of a computer is required for the analysis of multivariate data. The examples in class will be done using R or SAS. Everyone is encouraged to download a free copy of R. All necessary analyses will be able to be done in R or SAS.

**School Policies**

* No make ups for missed quizzes and exams will be given.
* The final exam will be given only at the scheduled time (math department policy).
* Cheating will not be tolerated.

**Attendance, absences, and makeup work**: Full participation in classes and examinations is expected of all students. Students are expected to inform the instructor in advance about any anticipated excused absences.

**Attention Students with Disabilities**

Students who need accommodations because of a disability should contact the UVU Accessibility Services Department (ASD), located on the Orem Campus, in LC 312. To schedule an appointment, or speak with a counselor, call the ASD office at 801-863-8747, or for Deaf/Hard of Hearing individuals, use the video phone number, 886-760-1819.

**Tentative Daily Schedule – MATH 4400, Spring 2017**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Monday** | **Wednesday** | **Friday** |
|  | Jan 9 : Syllabus 1.1 & 1.2, | Jan 11: 1.3 and 1.5 | Jan 13: 1.5 |
| 1 | HW: 1.6, Read 1.3 and write a note | HW: Read 1.4 and write a note | HW: 1.1 and 1.2 |
|  | Jan 16 | Jan 18: 1.5 and 1.6 | Jan 20: 1.6 |
| 2 | **Holiday** | HW: 1.4 and 1.7 | HW: 1.3 and 1.5 |
|  | Jan 23: 2.1 and 2.2 | Jan 25: 2.3 and 2.4 | Jan 27: 2.5-2.7 |
| 3 | Turn in HW | HW: 2.1, 2.2, and 2.3 | HW: 2.4, 2.5, and 2.6 |
|  | Jan 30: 3.1-3.2 | Feb 1: 3.2-3.3 | Feb 3: 3.4 |
| 4 | Homework: 1.4 and 1.7 | Homework: 1.3 and 1.5 | Homework: 1.3 and 1.5 |
|  | Feb 6: 3.5-3.9 | Feb 8: 3.10 | Feb 9-10 |
| 5 | Homework: 1.4 and 1.7 | Homework: 1.3 and 1.5 | **Review-1 EXAM I** |
|  | Feb 13: 3.11-3.12 | Feb 15: 3.13 | Feb 17: 3.13 |
| 6 | Homework: 1.4 and 1.7 | Homework: 1.3 and 1.5 | Chapter 4 |
|  | Feb 20 | Feb 22: 4.1-4.4.1 | Feb 24: 4.4.2 |
| 7 | President's Day | Chapter 4 | Chapter 4 |
|  | Feb 27: 4.4.3 | Feb 28-1: 4.5 | Mar 2-3: 4.6 |
| 8 | Chapter 4 | Chapter 4 | Chapter 4 |
|  | Mar 6 | Mar 7-8 | Mar 9-10 |
| 9 | Chapter 5 | Chapter 5 | Chapter 5 |
|  | Mar 13 | Mar 14-15 | Mar 16-17 |
| 10 | Chapter 5 | Chapter 5 | **Review-2 EXAM II** |
|  | Mar 20 | Mar 21 | Mar 24 |
| 11 | NO CLASS | NO CLASS | NO CLASS |
|  | Mar 27 | Mar 28 | Mar 31 |
| 12 | Chapter 6 | Chapter 6 | Chapter 6 |
|  | Apr 3 | Apr 4 | Apr 7 |
| 13 | Chapter 6 | Chapter 6 | Chapter 7 |
|  | Apr 10 | Apr 11 | Apr 14 |
| 14 | Chapter 7 | Chapter 7 | Chapter 7 |
|  | Apr 17 | Apr 18 | Apr 21 |
| 15 | Chapter 8 | Chapter 8 | Chapter 8 |
|  | Apr 24 | Apr 25-26 | Apr 27-28 |
| 16 | Chapter 8 | **Review-3 EXAM III** | **Final EXAM** |
| 17 | May 1  **Final Review EXAM** | May 2  **Final Review EXAM** |  |