Advanced Multivariate Statistics
NURS 6324.060
Fall 2025
Scheduled Class Days and Times: Online

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Office Hours: Virtual held via Zoom by appointment on Tuesdays from 11:00 AM to 2:00 PM. Email Dr. Gosselin to schedule an appointment.

Course Description: Students will study advanced multivariate techniques in health care research and apply aspects of complex research designs and advanced statistical techniques including logistic regression, multiple analysis of variance, and factor analysis.

Prerequisites: NURS 6322

Student Learning Outcomes:

Upon completion of this course, you should demonstrate knowledge and/or skills in the following statistical techniques including:

1) Logistic regression

2) Multivariate analysis of variance (MANOVA) and discriminant analysis.

3) Survey development and validation including content validity index (CVI) determination, latent variable techniques including exploratory factor analysis (EFA), principal component analyses (PCA) and an introduction to the confirmatory factor analysis (CFA).

4) Testing assumptions of the multivariate statistical tests.

5) Using statistical software, e.g., IBM SPSS and G*Power.

6) Reporting and interpreting statistical results and findings.

7) Critiquing healthcare research using advanced statistical methods. Assessment Methods will include use of quizzes, assignments and discussion board responses.

Required Textbooks and Readings:

Textbooks:

Field, A. (2017). *Discovering statistics using IBM SPSS: North American edition* (5th ed.). Sage Publications.

Pallant, J. (2020). *SPSS Survival Manual* (7th ed.). Routledge.

American Psychological Association. (2019). *Publication manual of the American Psychological Association* (7th ed.).

Software:

This course requires you to use the **IBM SPSS Statistic Standard Grad Pack**. Licenses (6 and 12 months) are available to purchase at academic pricing through OnTheHub: IBM® SPSS® Discounts for Students & Faculty. Use the "Student Buy Now" option.

Assignments and weights/point values

1.	Participation and Discussion Boards	15%
2.	Quizzes	15%
3.	Article Critique	10%
4.	Assignment 1 – Logistic Regression	20%
5.	Assignment 1 – MANOVA	20%
6.	Assignment 2 – Survey Science: EFA/PCA/CFA	20%
7.	Total	100%

Grading Scale:

Specific guidelines and grading criteria for all assignments are in the Modules. Final grades for the course will be determined based upon the following point assignments:

A - 90-100
B - 80-89
C - 70-79
D - 60-69
F - Below 60

Grades will not be rounded when calculating the average (79.5 is not rounded to 80, and 89.5 is not rounded to 90). Students are required to achieve an average of 80% (B) to complete the course successfully.

Although the university policy allows 60 days for grade appeals, the School of Nursing follows a stricter timeline of 10 days to facilitate students' timely progression through the curriculum. In

the case of extenuating circumstances, please consult the Associate Dean of Academic Affairs for guidance.

Exam and homework materials, questions, and problems are the intellectual property of faculty, UT Tyler, or publishers.

- These materials may not be distributed without permission.
- Distributing or uploading them to online resources destroys the integrity of the assignment and the course, allowing others an unfair advantage by letting them view the materials.
- Uploading these materials to online resources is a violation of UT Tyler's academic misconduct policies and may result in formal conduct charges.
- Sanctions for uploading or otherwise divulging the contents of these materials can include:
    - a reduced or failing grade on an assignment
    - a reduced or failing grade for the course
    - removal from the Nursing program
    - removal from UT Tyler

Late Work and Make-Up Exams: 5% will be deducted each day an assignment is past due, unless prior arrangements have been made with your course faculty. Extenuating circumstances may apply.

Repeating a Course: Students repeating this course may not use previously submitted assignments nor utilize the same patients for an assignment. Submitting the same or slightly modified assignments from previous semesters is considered self-plagiarism and is subject to academic discipline, including failing the assignment or the course.

Attendance and Make-up Policy: Attendance/participation is expected. Make-up for exams, quizzes, assignments, and missed content is at the instructor's discretion.

Statement on Artificial Intelligence

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course (see below) is considered a breach of academic integrity.

The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

For this course, AI is encouraged during the course, and appropriate acknowledgment is expected.

Students can use AI platforms to help prepare for assignments and projects. You can use AI tools to revise and edit your work (e.g., identify flaws in reasoning, spot confusing or underdeveloped paragraphs, or correct citations). When submitting work, students must identify any writing, text, or media generated by AI. In this course, sections of assignments generated by AI should appear in a different colored font, and the relationship between those sections and student contributions should be discussed in a cover letter that accompanies the assignment when submitted.

Graded Course Requirements Information:

Participation and Discussion Boards: This is an opportunity to reflect on the course readings, discuss content with students and faculty, and demonstrate understanding of the course material (15% of your grade).

A Rubric for how postings will be graded is provided Canvas.

• Each participant is responsible for participating in the asynchronous discussions of each assigned module. This participation will include posting answers to questions posed by the instructor and replying to other participants' postings.
• Discussion postings should be made in a timely manner. Deadlines are listed in the Course Schedule. Please note that all discussion postings must be completed by midnight Central Standard Time on the due date.
• Participants should plan on entering the Discussion area several times a week to read and comment on other postings. Posting answers to the questions posed in the Discussion area should be done in advance of the deadline to allow other participants to have the opportunity to comment.
• Quality of answers is as important as quantity. A participant's comments should add to the discussion. Comments should be supported as required with references cited appropriately. The instructors and/or participants may use synchronous chats as the need arises.

The purpose of the discussion board in an online doctoral program is to take the place of the class interchange that would occur in a face-to-face class. We will expect you to share ideas you have gained from the literature, noting the source when appropriate and interpreting into your own words.

Quizzes: Quizzes may be taken twice within the due date on the calendar and the two scores will be averaged (15% of your grade).

Article Critique: This assignment is an opportunity for you to apply your knowledge by providing peer-review and critical evaluation of research. Details on the assignment will be provided in class (10% of your grade).

Assignment 1 (Logistic Regression): This assignment allows you to take your understanding of logistic regression through submission of an output file with the analysis and write up of the results in APA format. Additional information will be provided in class (20% of your grade).

Assignment 2 (Multiple Analysis of Variance): This assignment allows you to take your understanding of Multiple Analysis of Variance (MANOVA) through submission of an output file with the analysis and write up of the results in APA format. Additional information will be provided in class (20% of your grade).

Assignment 3 (Exploratory Factor Analysis and Principal Component Analysis): This assignment allows you to take your understanding of initial survey validation using Exploratory Factor Analysis (EFA) or Principal Component Analysis (PCA) through submission of an output file with the analysis and write up of the results in APA format. Additional information will be provided in class (20% of your grade).

Calendar of Topics, Readings, and Due Dates:

Unit 1: Theory Y: Learning It				
Week #	*Date*	*Class Topic*	*Readings*	*Assignments Due*
Intro Week	Th 8/28			
Week 1	Mo 9/01	**Labor Day, no class (Sep. 1)**	Syllabus Course Calendar Assignments Overview	
	Tu 9/2	Module 1: Discussion and What's New?	Chapter 13: Multiple Regression (Pallant, 2020).	Intro discussion post (09/05)
Week 2	09/8	Module 1: Sample Size Determination	Watch sample size determination video.	Original discussion post by 09/10 (11:59 PM CT) and discussion responses by 09/12 (4:00 PM CT) **Sep 10. – Census date**

Week 3	09/15	Module 2: Logistic Regression	Chapter 20: Categorical Outcomes: Logistic Regression (Field, 2017) Chapter 14: Logistic Regression (Pallant, 2020)	Original logistic regression discussion by 09/17 (11:59 PM) and response to logistic regression discussion by 9/19 (4:00 PM)
Week 4	09/22	Module 3: Applications and Translation of Logistic Regression	Logistic regression sample write up (Gosselin, n.d.)	Logistic Regression Analysis Database Lab (DBL) by 4:00 PM on 09/26
Week 5	09/29	Module 4: Evaluating the Research Literature	Coughlan et al., 2007	
Week 6	10/6	Module 4: Evaluating the Research Literature (cont.)	Select on of the posted articles (Btoush et al., 2015; Babington et al., 2015; Smylie et al., 2014	Article Critique through Evaluating the Literature by 10/10 (4:00 PM)
Week 7	10/13	Module 5: MANOVA	Chapter 17: GLM 4: Repeated-Measures Designs (Field, 2017). Chapter 21: Multivariate Analysis of Variance (Pallant, 2020)	MANOVA quiz (two attempts must be completed by 10/17 at 11:59 PM)
Week 8	10/20	Module 5: MANOVA (cont.)	Green, 2015 and Partiprajak et al., 2011 articles	MANOVA Database Lab due 10/24 by 4:00 PM
Week 9	10/27	Module 6: Introduction to Survey Science & Content Validity Index	Yusoff, M. S. B. (2019) article.	
Week 10	11/3	Module 6: Introduction to Survey Science & Content Validity Index (cont.)		CVI Calculation by 11/7 (4:00 PM) **Nov. 4 – Last day to drop with a "W"**

Week 11	11/10	Module 7: Exploratory Factor Analysis	Chapter 18: Exploratory Factor Analysis (Field, 2017) Chapter 15: Factor Analysis (Pallant, 2020)	EFA Quiz (due by 11:59 PM on 11/14)
Week 12	11/17	Module 7: Exploratory Factor Analysis (cont.)		EFA or PCA Database Lab Assignment (4:00 PM on 11/21
Week 13	11/24	**University Holiday; no classes**		
Week 14	12/1	Module 8: Confirmatory Factor Analysis and Course Summation	Rogers (2024), Palinkas et al. (2015), and Irwin et al. (2010) articles.	Original discussion post due by 4:00 PM on 12/5
Week 15	12/8	Module 8: Confirmatory Factor Analysis and Course Summation (cont.)		Response to discussion post due 12/10 by 4:00 PM

***Assignments are due on the designated Friday of the corresponding week by 4:00 PM CT unless otherwise noted (e.g., discussion board posts with responses, quizzes, and in Week 15).**

School of Nursing Policies and Additional Information:
https://www.uttyler.edu/nursing/college/student_guide_and_policies.php

Student Resources and University Policies are provided in Canvas.