

NURS 6324 Multivariate Statistics
Long summer 2018
School of Nursing | The University of Texas at Tyler

A note from Dr. He:

Welcome to Multivariate Statistics! It is always great to see familiar names again. Up to this point, you have had univariate and bivariate statistics. Being able to speak the language of statistics and tell the stories behind the numbers is fascinating itself, though some of you may not necessarily agree and probably have mixed feelings. 😊 While this course is intended to moderately challenge you by extending your knowledge and skills in quantitative data analysis, it is desired and designed with efforts to make a positive learning experience for you. I personally enjoy statistics and like trying strategies in my teaching to make stats simpler, more sensible and pleasant, so always feel free to let me know what you think works best for you to learn. I always believe if I can learn stats, everyone can, because I had a bachelor degree in language education and started graduate school with a zero stats background. Looking back, I consider these experiences precious as they allow me to take a learner's approach in my teaching where students' learning is always the priority. I look forward to a rewarding long summer with everyone!

Faculty Information



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Course Information

From the catalog: Within this course, students will study multivariate statistical techniques in health care research and apply aspects of complex research designs, including multivariate model testing, decision theory, and advanced statistical techniques. This is a three-credit course and requires the prerequisites of NURS6320 Data Management and NURS 6322 Advanced Statistic or equivalent courses with instructor permission.

Translated into stats: Now you know how to (1) describe and summarize sample characteristics, (2) examine group differences to see if an intervention or program works (*t*, all the ANOVA tests, and their non-parametric counterparts), and (3) look into the relationships among things in a phenomenon (all correlation coefficients, parametric and non-parametric, and regression). In this course, you will continue to learn (1) comparing group differences (but in multiple outcomes at a time, i.e., MANOVA & DA), (2) examining relationships (but among more variables, both continuous, i.e., path analysis, and categorical, i.e., logistic regression), and beyond that, (3) applying the latent variable techniques (i.e., EFA and CFA etc.) to measure latent constructs (usually psychological or behavioral with multiple indicators).

Student Learning Outcomes and Assessment

This course is expected to be a bridge to bring you beyond your learning experiences with univariate and bivariate statistics and introduce you to more sophisticated quantitative data analysis techniques to address the corresponding research questions. After you complete this course, you should demonstrate knowledge and/or skills in the following statistical techniques including:

Student Learning Outcomes	Assessment Methods
1. Regression analyses including (besides multiple regression) logistic regression and path analysis.	Quizzes and Assignments
2. The multivariate general linear model (MANOVA) and discriminant analysis.	Quizzes and Assignments
3. The latent variable techniques including exploratory factor analysis (EFA) and principal component analyses (PCA) with an introduction to the confirmatory factor analysis (CFA).	Quizzes and/or Assignments
4. A conceptual understanding of more sophisticated techniques of the structural equation modeling (SEM)	Discussion board posts
5. Testing assumptions of the multivariate statistical tests.	Quizzes and/or Assignments
6. Using statistical software, i.e., SPSS and G*Power.	Quizzes and/or Assignments
7. Reporting and interpreting statistical results and findings.	Quizzes and/or Assignments
8. Working with secondary data from national health research studies.	Assignments

Textbooks, References, Required Software, and Useful Websites

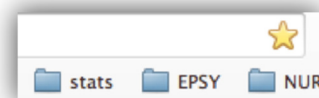
Textbooks: Required readings used in this course will be a compilation of book chapters, journal articles, and website resources (available on Canvas provided by the instructor).

Reference texts include:

- Field, A. (2017). *Discovering statistics using IBM SPSS: North American edition/ 5th edition*. Thousand Oaks, CA: Sage. Publications.
No need to buy the latest edition if you already have the 4th edition from NURS6322.
- American Psychological Association. (2009). *Publication manual of the American Psychological Association*. (6th ed.). Washington, D.C.: Author. ISBN 1433805618

Software: The most recent version of SPSS or the one available at UT Tyler through Citrix.

Useful websites: There are many great resources out there. I expect this course to continually help you develop that researcher's independence in statistical skills, which involves finding solutions to problems on your own. The websites below are helpful learning tools and consultation resources. While you may want to bookmark them, an alternative can be to create a "stats" folder on your browser tool bar and start putting together your own toolkit. Something like this. →



- The Institute for Digital Research and Education at UCLA:

<http://www.ats.ucla.edu/stat/> (refer to the RESOURCES tab or SOFTWARE where resources were categorized by software packages).

- An anonymous stats professor’s personal website with stats topic presentations, SPSS demon videos, and sample results: <http://www.how2stats.net/p/home.html>
- *Mplus* (stats software package featuring latent variable techniques) discussion forum: <http://www.statmodel.com/cgi-bin/discus/discus.cgi?pg=topics>
- Research methods knowledge base: <http://www.socialresearchmethods.net/kb/index.php>

Assessments and Grading*

Quizzes	30% (5@6% each)	A = 89.5 -100
Assignments	60% (#1, 3, 4 @12%, #2@4%+12%, #5@8%)	B = 79.5 – 89
Learning reflections	5%	C = 69.5 - 79
Course participation	5%	D = 59.5 - 69
		F = Below 59.5
<hr/>		
Total	100%	

**Students are expected to achieve an average of B (80%) to successfully complete the course.*

Graded items: Refer to Canvas for more detailed information on descriptions, templates, and grading rubrics for specific assessed items. In brief:

- Quizzes may be taken twice (at least once in the time frame) but must be completed by the due date on the calendar and the two scores are averaged. Late attempts will be graded at a discount rate of 10%/day.
- Assignments are due per the course calendar. No extension is given without prior faculty approval. There is a 5 points/day penalty for late assignments (on a 100-point scale).

Workload and Time Expectations

You should expect to spend as much time on an online course as you do in a face-to-face course. Besides lecture/demo videos (or live Zoom meetings), a typical week’s work for this course will include (1) assigned reading, (2) a quiz on the topic under discussion, and/or (3) assignments/discussion. As a rough guide, you should plan to spend *six to ten hours per week* on this course. The actual amount of time will vary from individual to individual.

The same bi-weekly schedule is adopted in this course with one week focusing on reading the content and the other on working on the hands-on tasks. You will have access to all the course materials. The modules will remain up through the end of the course. You may look and study ahead within the modules or go back and review a past module at any time during the course.

Communications

If you took the previous two stats courses with me, you should be familiar with below. ☺

Email

To communicate by email within the course with single participants, click the **People** link on the left navigation menu once you enter the course on Canvas, then select the person to send a message. To send messages to all course participants, you can go to your **Inbox** and click the **compose** icon and select the group from the **To** box. If you need more instructions on how to send email messages with Canvas please read/watch the recourses from **Search the Canvas Guides** under the **Help** button. In the case of technical problems, keep your faculty informed so that arrangements can be made as necessary.

Questions or problems other than technical may be submitted to the faculty email address (zhe@uttyler.edu). I strongly encourage you to post your questions in Canvas because more often than not your peers may have similar questions. Be it post or email, specificity helps me and your peers to process it faster. Please also include the reference information such as the Module/Week/page number or screenshot if necessary. While I usually take care of student emails quite well, allow 24 hours for weekdays and 48 hours for weekends to hear from me. You will be notified in advance in the case of conference travel and other situations when the Internet access is limited or unavailable. Also, faculty members usually set aside a specific time for their own research, so responses may be delayed (e.g., to the end of the day) depending on your faculty's schedule. My research day is Thursday (call my cell number if it is urgent).

Course Discussions

Technical tips: The Discussions feature in Canvas is an online discussion forum in which students and faculty can communicate asynchronously (at differing times) via message postings. Students can and will usually be expected to respond to threads in the course discussion. To respond to a thread:

- In the **Discussion** area, you will see a list of discussions.
- Click on a discussion link to open it and view the contents within and
- Click **Reply** to respond to the message

Time & frequency: Canvas takes the place of in class discussions so please plan on spending sufficient time reading and posting in order to have a high quality experience. Postings should occur several times during the week rather than several in one day. *When individuals wait to post late in the week, the whole group suffers from the lack of full group interaction. Posting late also reduces the opportunity to get feedback.*

Check the Discussions section often (or you can **Subscribe** to a discussion so you never miss posts, but some may find extra emails stressful so make your own decision). Since the discussion is asynchronous, other responses will be submitted after your post. Be sure to check the Discussions section each time you log into the course to view any added material and respond to your peers' comments.

Quality learning: Asking questions and posing a different viewpoint yields higher quality learning experiences than simply giving kudos. Posting responses to colleagues on Canvas is an opportunity to give your peers input. Your instructor will generally delay feedback to

give the group members a chance to post. When the instructor posts too quickly, others sometimes become reticent to post. An important behavior in graduate education is questioning. Never hesitate to share different viewpoints and disagree with all colleagues including your instructors.

UNIVERSITY POLICIES

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link:

<http://www2.uttyler.edu/wellness/rightsresponsibilities.php>

Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at

<http://www.uttyler.edu/about/campus-carry/index.php>

UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions that students need to be aware of. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a “W” grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks

violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

- i. "Cheating" includes, but is not limited to:
- copying from another student's test paper;
 - using, during a test, materials not authorized by the person giving the test;
 - failure to comply with instructions given by the person administering the test;
 - possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
 - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
 - collaborating with or seeking aid from another student during a test or other assignment without authority;
 - discussing the contents of an examination with another student who will take the examination;
 - divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors have designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
 - substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
 - paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
 - falsifying research data, laboratory reports, and/or other academic work offered for credit;
 - taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
 - misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

- ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.
- iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
- iv. All written work that is submitted will be subject to review by plagiarism software.

UT TYLER RESOURCES FOR STUDENTS

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses
- UT Tyler Counseling Center (903.565.7254).

TECHINCAL INFORMATION

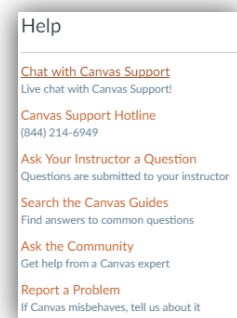
Technical Support

If you experience technical problems or have a technical question about this course, you can obtain assistance by contacting the Canvas Support (24/7) under the [Help](#) button. You have multiple options including live chat, hotline phone call, searching the FAQs, ask the community, and report the problem. Again, in the case of technical problems, keep your faculty informed so that arrangements can be made as necessary. Questions or problems other than technical may be submitted to the faculty email address zhe@uttyler.edu.

Plug-ins and Helper Applications

UT Tyler online courses use Java, JavaScript, browser plug-ins, helper application and cookies. It is essential that you have these elements installed and enabled in your web browser for optimal viewing of the content and functions of your online course.

- **Adobe Reader** allows you to view, save, and print Portable Document Format (PDF) files. <http://get.adobe.com/reader/>
- **Java Runtime Environment (JRE)** allows you to use interactive tools on the web. <http://www.java.com/en/download/>
- **Adobe Flash Player** allows you to view content created with Flash such as interactive web applications and animations. <http://get.adobe.com/flashplayer/>
- **QuickTime** allows users to play back audio and video files. <http://www.apple.com/quicktime/download/>
- **Windows Media Player** allows you to view, listen and download streaming video and audio. <http://windows.microsoft.com/en-US/windows/products/windows-media-player>
- **RealPlayer** allows you to view and listen to streaming video and audio. <http://www.real.com/>



Netiquette Guide

“Netiquette” is network etiquette, the do’s and don’ts of online communication. Netiquette covers both common courtesy online and informal “rules of the road” of cyberspace.

Review and familiarize yourself with the guidelines provided.

<http://www.learnthenet.com/learn-about/netiquette/index.php>

Course Schedule

Modules	Weeks & Dates	Topics	DUE*
1. Path modeling	Week 1 5/21-27	Path analysis	Quiz 1: PA
	Week 2 5/28-6/3	Hands-on	Assign.1: PA
2. More modeling	Week 3 6/4-10	Logistic regression	Quiz 2: LR Assign.2-1: LR DB
	Week 4 6/11-17	Hands-on	Assign.2-2: LR
3. Comparing groups 2.0	Week 5 6/18-24	Multivariate analysis of variance Discriminant analysis	Quiz 3: MANOVA & DA
	Week 6 6/25-7/01	Hands-on	Assign.3: MANOVA & DA
	Week 7 7/2-8	Percolate & Ponder	
4. Instrument development (Latent variable technique)	Week 8 7/9-15	Exploratory factor & principal component analyses	Quiz 4: EFA
	Week 9 7/16-22	Hands-on	Assign.4: EFA
	Week 10 7/23-29	Confirmatory factor analysis	Quiz 5: CFA
	Week 11 7/30- 8/5	Hands-on	Assign 5: measurement critique
5. What's next?	Week 12 8/6-10	Introduction to the structure equation modeling (SEM)	Reflections

*Refer to the course calendar and the BB for specific due dates for the quizzes and assignments.

A convenient semester course calendar

Week	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
I.		May 21 Classes begin	22	23	24	25	26
II.	27 Quiz 1	28 Memorial Day	29 Zoom	30	31	June 1	2
III.	3	4 Assign. 1	5	6	7	8	9
IV	10	11 Quiz 2 Assign. 2-1	12 Zoom	13	14	15	16
V.	17	18 Assign. 2-2	19	20	21	22	23
VI.	24	25 Quiz 3	26 Zoom	27	28	29	30
VII.	July 1 Assign. 3	2 P&P	3 Independ ence Day	4 P&P	5 P&P	6 P&P	7
VIII.	8	9	10	11	12	13	14
IX.	15	16 Quiz 4 Last day to withdraw	17 Zoom	18	19	20	21
X.	22	23 Assign. 4	24	25	26	27	28
XI.	29	30 Quiz 5	31 Zoom	August 1	2	3	4
XII.	5	6 Assign. 5	7	8	9	10 Reflections Semester End	11