



Healthcare Informatics

NURS 6303

Spring 2025

Scheduled Class Days and Times: Online

Instructor's Name: Huaxin Song, PhD.

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Office Hours: Virtual Office Hours: Wednesday 7:30pm to 8:30pm CST and available via appointment, email, phone, and/or Zoom.

*Best way to contact me. Texting is always okay if you need immediate assistance. Please make sure to include your name and the course number in your text message.

Course Description: This course provides an introduction to data management principles and basic statistics focused on quality improvement in healthcare system tailored to Nursing DNP students with little to no prior experience in data science. The course aims to equip students with the foundational knowledge and skills necessary to effectively manage and manipulate data in healthcare settings. Topics covered include process analysis, data collection methods, data visualization for QI purpose, and prepare data for statistical analysis. Through hands-on exercises and projects, students will gain practical experience with data management tools and techniques applicable to their future DNP projects.

Student Learning Outcomes:

Upon successful completion of this course, the student will be able to:

- 1) Understanding the concept of quality improvement in healthcare;
- 2) Understanding quality measures, data structure, and data collection process.
- 3) Managing and screening data by identifying variable properties (e.g., scales of measurement).
- 4) Generating aggregated data from individual level data for conduct run/control charts
- 5) Obtaining and interpreting sample characteristics or descriptive statistics (i.e., central tendency, variability, and other aspects of the sample as necessary).
- 6) Understanding the mechanism of inferential statistics (i.e., the theory of hypothesis testing and probability).
- 7) Knowing the proper statistical test to use to answer group differences and relationships questions.
- 8) Using data analytic software (i.e., SPSS) to conduct the above activities.
- 9) Working with primary and secondary data.

Required Textbooks and Readings:

- Strome, Trevor L.. *Healthcare Analytics for Quality and Performance Improvement*, John Wiley & Sons, Incorporated, 2013. *ProQuest Ebook Central*, <https://ebookcentral.proquest.com/lib/uttyler/detail.action?docID=1443907>.
 - McFedries, Paul, and Greg Harvey. *Excel All-In-One for Dummies*, John Wiley & Sons, Incorporated, 2021. *ProQuest Ebook Central*, <https://ebookcentral.proquest.com/lib/uttyler/detail.action?docID=6802704>.
- Optional: Pallant, J. (2020) *SPSS Survival Manual*, 7th edition. New York: McGraw Hill Education (available at University B & N bookstore or online).

REQUIRED SOFTWARE

The most recent version of SPSS: Statistics package for the social sciences.

Microsoft office 365- Excel

IBM® SPSS® Statistics **Premium** GradPack 29 (6 and 12 month licenses available at <http://www.onthehub.com/spss/>) You will use this software throughout the program, so you may want to consider the 12 month license. (DO NOT purchase the basic package; it does not have all the functionality you need for course work).

Assignments and Weights/Percentage/Point Values

Assessment Methods	Percentile
Quizzes (5)	40%
Data Assignments (5)	40%
QI Project	20%
	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.

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 Policy: 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 clinical time is at the instructor's discretion.

Graded Course Requirements Information:

Description of Assessment Methods
Quizzes (5) short online assessment of learning based on readings and course materials provided in Canvas.
Data Assignments (5) data analysis and interpretation of statistical output in mini assignments.
Data Management Project – Please follow the instruction and template to generate your research data management and analysis plan. Please use SPSS or other programs to reveal description of sample and to answer a research question through application of the 7 steps of data analysis. Preparation and video presentation of research findings.

Calendar of Topics, Readings, and Due Dates:

WEEK	CONTENT	ASSIGNMENT/DUE
Wk. 1: 1/6	Start with Critical Thinking <ul style="list-style-type: none"> • Overview the software and platforms for data management • Understand coding /syntax • Introduce ChatGPT /Copilot 	Discussion Board

Wk. 2: 1/13	Quality and Safety (IHI) <ul style="list-style-type: none"> • Demonstrate a foundational understanding of the quality improvement process and patient safety by completing the Institute for Healthcare Improvement Open School's Basic Certificate in Quality and Safety and completing/presenting the design of a quality improvement project 	Discussion Board IHI certificate is due on March 27
Wk. 3: 1/20	Workflow/Process Analysis <ul style="list-style-type: none"> • Distinguish between clinical workflow analysis & value stream mapping. • Complete a workflow analysis diagram. • Explain the use of three different change management theories. • Examine the role of informatics in supporting the change process. 	Assignment 1 Clinical Workflow Analysis
Wk. 4 1/27	Introduction to data management <ul style="list-style-type: none"> • Categorize data types for appropriate analysis. • Convert data between various formats (CSV, XLSX, SAV, wide, and long). • Implement data coding schemes and practices for integrity. • Create a comprehensive data dictionary for effective data management. 	Assignment 2 Data dictionary
Wk. 5: 2/3	Data collection <ul style="list-style-type: none"> • Overview of data collection methods (surveys, interviews, observations, etc.) • Understand Data collection bias 	Quiz 1

	<ul style="list-style-type: none"> • Understand sample size estimation • Best practices for ensuring data accuracy and reliability 	
Wk. 6: 2/10	Data Visualization <ul style="list-style-type: none"> • Understanding the distribution Outliers and extreme outliers • Detecting patterns and relationships • Importance of data visualization • Choosing appropriate visualization techniques • Hands-on practice with data visualization tools 	Quiz 2
Wk. 7: 2/17	Quality Improvement and Longitudual Data <ul style="list-style-type: none"> • Time series data • Quality Improvement concept • Control Chart 	Assignment 3 EDA and Data visualization using Excel
Wk. 8 : 2/24	Introduction to statistics <ul style="list-style-type: none"> • Data distributions • Descriptive analysis • Crosstab / Chi-Square tests 	Quiz 3
Wk. 9: 3/3	Compare means and correlation <ul style="list-style-type: none"> • Overview t-test, paired t-test, ANOVA test and Correlation test 	Assignment 4 Simple statistic tests
Wk. 10: 3/10	Understand Regression <ul style="list-style-type: none"> • Explain regression as a statistical method for modeling the relationship between a dependent variable and one or more independent variables. • Introduce different regression tests • Introduce path analysis. • Introduce Structural Equation Modeling (SEM) 	Quiz 4

Spring Break!		
Wk. 11: 3/24	Understand Classification model <ul style="list-style-type: none"> • Explain how to use logistic regression for classification. • Introduce decision trees for non-parametric classification. 	Assignment 5 Analysis using SPSS
Wk. 12: 3/31	Understand Text Analytics <ul style="list-style-type: none"> • Explain key components of text analytics • Introduce text analytics techniques • Use visualization tools to generate word cloud 	Quiz 5
Wk. 13: 4/7	Usability and presentation of information <ul style="list-style-type: none"> • Dashboard/Power BI 	Discussion
Wk. 14: 4/14	Final Presentation Week	QI Project presentation

School of Nursing Policies and Additional Information:

https://www.uttyler.edu/nursing/college/student_guide_and_policies.php

Student Resources to assist you in this course:

[UT Tyler Student Accessibility and Resource \(SAR\) Office](#) (provides needed accommodations to students with document needs related to access and learning)

[UT Tyler Writing Center](#)

[The Mathematics Learning Center](#)

[UT Tyler PASS Tutoring Center](#)

[UT Tyler Supplemental Instruction](#)

[Robert Muntz Library \(Links to an external site.\)](#) and [Library Liaison](#)

[Canvas 101](#) (learn to use Canvas, proctoring, Unicheck, and other software)

Digital Support Toolkit (for supported courses only. Students are automatically enrolled in the toolkit for supported courses)

LIB 422 -- Computer Lab where students can take a proctored exam

[The Career Success Center](#)

[UT Tyler Testing Center](#)

[Office of Research & Scholarship Design and Data Analysis Lab](#)

Resources available to UT Tyler Students

[UT Tyler Counseling Center](#) (available to all students)

[TAO Online Support Center](#) (online self-help modules related to mental & emotional health)

[Military and Veterans Success Center](#) (support for all of our military-affiliated students)

[UT Tyler Patriot Food Pantry](#)

[UT Tyler Financial Aid and Scholarships](#)

[UT Tyler Registrar's Office](#)

[Office of International Programs](#)

[Title IX Reporting](#)

[Patriots Engage](#) (available to all students. Get engaged at UT Tyler.)

University Policies and Information

Withdrawing from Class: Students, you are allowed to [withdraw](#) (drop) from this course through the University's Withdrawal Portal. Texas law prohibits students 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 other 2-year or 4-year Texas public colleges and universities. Make sure to consider the impact withdrawing from this class has on your academic progress as well as the financial implications. We encourage you to consult your advisor(s) and financial aid for additional guidance. CAUTION #1: Withdrawing before census day does not mean you get a full refund. Please see the [Tuition and Fee Refund Schedule](#). CAUTION #2: All international students must check with the [Office of International Programs](#) before withdrawing. All international students are required to enroll full-time for fall and spring terms.

Final Exam Policy: Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members are required to maintain student final examination papers for a minimum of three months following the examination date.

Incomplete Grade Policy: If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in lieu of a grade only when all of the following conditions are met: (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all course work or final exam due

to unusual circumstances that are beyond personal control and are acceptable to the instructor, and (c) the student presents these reasons prior to the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average for a student.

The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to complete all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has not been assigned within one year, then the Incomplete will be changed to an F or NC if the course was originally taken under the CR/NC grading basis.

Grade Appeal Policy: UT Tyler's Grade Appeal policy requires the completion of a Grade Appeal form for this action to take place. The grade appeal begins with the instructor of your course. If you do not agree with the decision of the instructor, you may then move your appeal to the department chair/school director for that course. If you are still dissatisfied with the decision of the chair/director, you may move the appeal to the dean of the college offering that course, who has the final decision. Grade appeals must be initiated within sixty (60) days from the date of receiving the final course grade. The grade Appeal form is found on the [Registrar's Form Library](#).

Disability/Accessibility Services: The University of Texas at Tyler has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Students with disabilities who may need accommodation(s) in order to fully participate in this class are urged to contact the Student Accessibility and Resources Office (SAR) as soon as possible to explore what arrangements need to be made to ensure access. If you have a disability, you are encouraged to visit the SAR Portal (<https://hood.accessiblelearning.com/UTTyler/>) and complete the New Student Application. For more information, please visit the [SAR webpage](#) or call 903.566.7079.

Military Affiliated Students: UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with me if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make me aware of any complications as far in advance as possible. I am willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. Campus resources for military-affiliated students are in the [Military and Veterans Success Center \(MVSC\)](#). The MVSC can be reached at MVSC@uttyler.edu or via phone at 903.565.5972.

Academic Honesty and Academic Misconduct: The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the [Student Conduct and Discipline policy](#) in the Student Manual Of Operating Procedures (Section 8).

FERPA: UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in [University Policy 5.2.3](#). The course instructor will follow all requirements in protecting your confidential information.

COVID Guidance: The UT Tyler community of Patriots respects the rights of others to wear a mask if they desire to do so. COVID guidelines may change as the situation warrants, and students should follow the instructions warranted by the situation.

Absence for Official University Events or Activities: This course follows the practices related to approved absences as noted by the Student Manual of Operating Procedures ([Sec. 1 -501](#)).

Absence for Religious Holidays: Students who anticipate being absent from class due to a religious holiday are requested to inform the instructor by the second class meeting of the semester.

Campus Carry: We respect the right and privacy of students 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>.