Syllabus for PADM 590: Health Analytics

Instructor: Dr. Yi Tang
Email: tangyi@unm.edu
Office Location: SSCO 3038, and/or via Zoom
Course Credits: 3.0
Office Hours: Mondays 4-6pm, and/or by appointment
Class Location: TBA, or via Zoom
Class Meeting Time: Tuesdays 6:00-8:45pm

Course Description

This course offers a comprehensive introduction to data analytics in healthcare, with a focus on equipping students with practical skills and a structured approach to problem-solving. Students will explore key topics, including data collection, assessing data quality, data visualization, descriptive analytics, predictive analytics, and basic machine learning techniques for both structured and unstructured data. The majority of the coursework will use Excel, while Python will be introduced for machine learning applications.

In addition to mastering technical techniques, students will learn to approach health analytics strategically, beginning with asking appropriate and actionable questions. They will develop the ability to design effective data collection strategies, select suitable analytical methodologies, and generate clear, accurate reports that offer meaningful interpretations of the results. The emphasis on practical application ensures students gain the competence to transform healthcare data into actionable insights that support decision-making and improve organizational performance.

This course is closely aligned with the National Center for Healthcare Leadership's Health Leadership Competency Model 3.0. Through hands-on learning and real-world applications, students will enhance their ability to execute healthcare analytics projects, foster transformation through data-driven decision-making, and strengthen their understanding of the healthcare system's complexities. By fostering self-awareness and continuous development, this course prepares future healthcare leaders to navigate the increasingly data-driven landscape of healthcare management with confidence.

Course Objectives and Student Learning Outcomes

Upon completion of this course, students will be able to:

1. Formulate clear and actionable questions in healthcare settings that can be addressed using data analytics.
2. Collect and evaluate healthcare data from various sources, ensuring data reliability and quality.
3. Utilize Excel to conduct data cleaning, descriptive statistics, and visualization.
4. Apply foundational concepts in data analysis and interpret results in the context of healthcare.
5. Develop skills in predictive analytics and basic machine learning using Python to address healthcare-specific problems.
6. Design and execute comprehensive data analytics projects, moving from question formulation to data collection, analysis, and report generation.
7. Create professional, data-driven reports that provide actionable insights for healthcare managers and policymakers.
8. Deliver professional presentations of data analytics results, using clear visualizations and effective

communication to convey key insights.
9. Enhance health system awareness by understanding how data analytics supports strategic decision-making and operational improvements in healthcare.
10. Cultivate self-awareness and continuous improvement in analytical thinking and problem-solving, in line with the NCHL Health Leadership Competency Model 3.0.

Textbooks and Supplies

- **Recommended textbook (1)**: *Data Analysis for Business, Economics, and Policy by Gábor Békés and Gábor Kézdi. ISBN: 9781108716208 (paperback); 9781108591102 (eBook)*
- **Recommended textbook (2)**: *Health Services Research and Analytics Using Excel® by Nalin Johri. ISBN: 978-0-8261-5027-1 (Print); 978-0-8261-5028-8 (eBook)*
- The textbooks will be available from the UNM Bookstore. The Bookstore can guide you to the purchase of a physical textbook or to purchase of an electronic copy of the texts.
- Textbooks are optional for this course. Course contents will be synthesized from these two textbooks, so they can be great resources for you to review key concepts and techniques.
- Additional course materials will be available in the Canvas course modules each week.

Course Assessments

Assessment	**% of Grade**
Attendance	10%
In-class Activities	10%
3 Assignments	60%
Course Project Presentation	10%
Course Project Report	10%
Total	**100%**

Grading Scale

A+	98 - 100%	--	
A	93 – 97%	B-	75 – 79%
A-	89 – 92%	C+	70 – 74%
B+	85 – 88%	C	60 – 69%
B	80 – 84%	F	Below 60%

Grade Requirements for Graduation

To earn a graduate degree at the University of New Mexico, students must have a minimum cumulative grade point average of 3.0 in graduate-level courses taken in graduate status at the time of degree completion as well as a grade point average of at least 3.0 for courses listed in their Program of Studies or Application for Candidacy. Students may not graduate with Incompletes or unrecorded grades (NR) pending in any graduate course, nor may they graduate while on probation. Courses taken to meet undergraduate deficiencies/prerequisites cannot be used to meet graduate degree requirements nor are they calculated into the graduate grade point average. It is expected that the student earns at least a B (3.0) in each of these courses. If a grade of less than "B" (3.0) is earned in any of these, the major department may deem that the prerequisite

has not been satisfied. No more than 6 credit hours of coursework in which a grade of "C" (2.0), "C+" (2.33) or "CR" (grading option selected by student) was earned may be credited toward a graduate degree. Courses offered only on a CR/NC basis and required by the graduate program are excluded from this limitation.

Course Modality

This course is being scheduled as an O+C (Online + Classroom) course. In-person students (Section 001) will attend class face-to-face and remote students (Section 002) will attend via Zoom. To ensure equal learning experience and that students from both sections can communicate with each other, the Canvas sessions for both class sections are combined into a joining session. For the Zoom meetings, you will need:

- A headset with microphone. Headsets are widely available at stores that sell electronics, at the UNM Bookstore or online.
- A high-speed internet connection is highly recommended for these sessions. Please test your wireless Internet connection for audio and/or video quality prior to web conferencing.
- **A Zoom link which can be found on Canvas → "Zoom Meetings".**

For UNM Web Conference Technical Help: (505) 277-0857

Technical Skills

In order to participate and succeed in this class, you will need to be able to perform the following basic technical tasks:

- Use Canvas (help documentation located in "Help" > "UNM Canvas Help Site" link on left course menu, and also at Online Student Documentation).
- Use email – including attaching files, opening files, downloading attachments
- Copy and paste within applications including Microsoft Office
- Open a hyperlink (click on a hyperlink to get to a website or online resource)
- Use Microsoft Office applications
- Create, download, update, save and upload MS Word documents and MS PowerPoint presentations
- Download, annotate, save and upload PDF files
- Download, install, and use the in-course web conferencing tool (Zoom)

Technical Requirements

Computer

- A high-speed Internet connection is highly recommended.
- A supported web browser: Detailed Supported Browsers and Operating Systems.
- Any computer capable of running a recently updated web browser should be sufficient to access online course resources (Canvas, the library, YouTube, etc.). However, bear in mind that processor speed, amount of RAM and Internet connection speed can greatly affect performance. Many locations offer free high-speed Internet access including UNM's Computer Pods.

Microsoft Office products are available free for all UNM students (more information on the UNM IT Software Distribution and Downloads page)

Canvas outages: Unexpected Canvas system outages are rare but, if they occur, I will advise everyone on how to proceed. For UNM Canvas Technical Support: (505) 277-0857 (24/7) or visit the Canvas Info Site.

Coursework and Participation

Procedures for Completing Coursework

- Deadlines get things done. The deadlines for the assignments in class are designed for your benefit and to balance my workload. I strongly encourage you to use these deadlines to help your own time management for the semester. However, we are living in unpredictable times. If you have a schedule conflict, please contact me as soon as possible **before the deadline**, and we will work together to find a solution.
- All written work needs to be submitted online. If you have difficulty using a tool to complete work, please reach out to UNM's Canvas Support immediately and notify me as well.

Credit Hour Statement

This is a three credit-hour course. Class meets for 2 hours and 45 minutes of direct instruction each week during the semester. Please plan for a *minimum* of six hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week. (Some weeks will be a little less, some a little more.)

> **Support:** Student Learning Support at the Center for Teaching and Learning offers individual consultations and online support for graduate students through the Graduate Resource Center (GRC). This includes support through the UNM Graduate Online Writing Lab, where you can seek feedback on your writing and research projects.

Attendance Policy

Regular and punctual attendance is essential to both doing well and to fostering a space for learning. UNM *Pathfinder* policies apply, which in part means instructor drops based on nonattendance are possible. This class is an interactive learning class, which means that student engagement is vital to maximizing the learning experience for everyone. One great benefit of our program is that you have a chance to work with other excellent students who are doing impressive work. However, in order to benefit from this network, you have to get to know your fellow students. If you don't show up, you won't. If you show up and don't engage, you won't. I will do as much as I can to optimize opportunities for connections in our virtual classroom experience. That said, I understand you have work, family and life commitments which at times conflict with our class schedule. **Please communicate with me before any (un)expected absence**. Three or more unexcused absences may result in permanent removal and a drop from the course with a "W" grade, or an "F" grade at the end. All class sessions will be available as recordings on Canvas as quickly as the recordings are finished processing. It is **your responsibility to take the initiative** in arranging to make up missed lectures and/or other course activities.

Office Hours

I have office hours set aside on Mondays from 4-6pm, but I prefer to do all office hours by appointment to best manage all our schedules. Send me an email to set up a meeting (time, day, mode, what the meeting is about), and we'll get something scheduled.

Expectations for Participation

- students are expected to learn how to navigate in Canvas
- students are expected to communicate with one another in team projects
- students are expected to keep abreast of course announcements
- students are expected to use the Canvas course inbox as opposed to a personal email address
- students are expected to keep instructor informed of class related problems, or problems that may prevent the student from full participation

Netiquette

Students are expected to follow the guidelines of netiquette when communicating and interacting in our course. Netiquette refers to a set of guidelines in online communication that help ensure positive interactions. In this case specifically, these guidelines seek to keep our online class a positive learning environment for everyone.

Accommodations

UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact Accessibility Resource Center at arcsrvs@unm.edu or by phone at 505-277-3506.

Responsible Learning, Academic Honesty, and AI Policy

Cheating, plagiarism, and unethical use of Generative AI (academic dishonesty) are often driven by lack of time, desperation, or lack of knowledge about how to identify a source. Communicate with me and ask for help, even at the last minute, rather than risking your academic career by committing academic dishonesty. Academic dishonesty involves presenting material as your own that has been generated on a website, in a publication, by an artificial intelligence algorithm (AI), by another person, or by otherwise breaking the rules of an assignment or exam. It is a Student Code of Conduct violation that can lead to a disciplinary procedure. When you use a resource (such as an AI, article, a friend's work, or a website) in work submitted for this class, document how you used it and distinguish between your original work and the material taken from the resource.

> **Support:** Many students have found that time management workshops or work with peer tutors can help them meet their goals. These and other resources, including support on how to cite a source, are available through Student Learning Assistance at the Center for Teaching and Learning.

Email policy

UNM policy 2540: Student Email notes that email policies may be determined by individual faculty for instructional purposes, which will be specified in the course syllabus, and must be followed by the students. For this class, all communications must be conducted either within the UNM Canvas or students' and instructor's UNM email. This is both to promote efficiency and to implement best practices in regard to digital communication, which as future health administrators will be of the utmost importance.

Indigenous Peoples' Land and Territory Acknowledgement

Founded in 1889, the University of New Mexico sits on the traditional homelands of the Pueblo of Sandia. The original peoples of New Mexico - Pueblo, Navajo, and Apache since time immemorial - have deep connections to the land and have made significant contributions to the broader community statewide. We honor the land itself and those who remain stewards of this land throughout the generations and also acknowledge our committed relationship to Indigenous peoples. We gratefully recognize our history.

Library Services

UNM-Main campus provides many library services and tutorial services, including a range of services for distance students. For library services, go to UNM Libraries for links to link to specific libraries on campus or to contact a librarian.

Weather

During the semester, contact the UNM hotline at 505-277-7669 to determine if classes havebeen cancelled. Appropriate adjustments will be made to the schedule as needed in the event of weather-related class cancellations.

Important UNM Dates

The Registrar's Office provides important semester deadline dates that students should know.

Title IX

The University of New Mexico and its faculty are committed to supporting our students and providing an environment that is free of bias, discrimination, and harassment. The University's programs and activities, including the classroom, should always provide a space of mutual respect, kindness, and support without fear of harassment, violence, or discrimination. Discrimination on the basis of sex includes discrimination on the basis of assigned sex at birth, sex characteristics, pregnancy and pregnancy related conditions, sexual orientation and gender identity. If you have encountered any form of discrimination on the basis of sex, including sexual harassment, sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. You can access the confidential resources available on campus at the LoboRESPECT Advocacy Center, the Women's Resource Center, and the LGBTQ Resource Center. If you speak with an instructor (including a TA or a GA) regarding an incident connected to discrimination on the basis of sex, they must notify UNM's Title IX Coordinator that you shared an experience relating to Title IX, even if you ask the instructor not to disclose it. The Title IX Coordinator is available to assist you in understanding your options and in connecting you with all possible resources on and off campus. For more information on the campus policy regarding sexual misconduct and reporting, please see UNM Administrative Policy 2740 and CEEO's website.

If you are pregnant or experiencing a pregnancy-related condition, you may contact UNM's Office of Compliance, Ethics, and Equal Opportunity at ceeo@unm.edu. The CEEO staff will provide you with access to available resources and supportive measures and assist you in understanding your rights. UNM's lactation stations are marked on the UNM campus map.

Citizenship and/or Immigration Status

All students are welcome in this class regardless of citizenship, residency, or immigration status. I will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to me, as noted in the attendance guidelines above. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website.

Respectful Conduct Expectations

I am committed to building with you a positive classroom environment in which everyone can learn. I reserve the right to intervene and enforce standards of respectful behavior when classroom conduct is inconsistent with university expectations [and/or classroom community agreements]. Interventions and enforcement may include but are not limited to required meetings to discuss classroom expectations, written notification of expectations, and/or removal from a class meeting. Removal from a class meeting will result in an unexcused absence. [Insert number] or more unexcused absences may result in permanent removal and a drop from the course (see attendance policy). The University of New Mexico ensures freedom of academic inquiry, free expression and open debate, and a respectful campus through adherence to the following policies: D75: Classroom Conduct, Student Code of Conduct, University Policy 2240 – Respectful Campus, University Policy 2210 – Campus Violence.

Connecting to Campus and Finding Support

UNM has many resources and centers to help you thrive, including opportunities to get involved in campus life, research experiences, mental health resources, academic support such as tutoring, resource centers for people like you, free food at Lobo Food Pantry, jobs on campus and financial capability support. Your advisor, staff at the resource centers and Dean of Students, and I can help you find the right opportunities for you.

Wellness

If you do need to stay home due to illness or are experiencing a wellness challenge, please take advantage of the resources below. You can communicate with me at tangyi@unm.edu / 612-300-2908 and I can work with you to provide alternatives for course participation and completion. Let me, an advisor, or another UNM staff member know that you need support so that we can connect you to the right resources.

Support

- Student Health and Counseling (SHAC) at (505) 277-3136.
- TimelyCare: Free 24/7 virtual care services (medical, emotional support, health coaching, self-care, basic needs support).
- LoboRESPECT Advocacy Center (505) 277-2911: help with contacting faculty and managing challenges that impact your UNM experience.

SCHEDULE OF ACTIVITIES (Tentative)

Note: The Schedule of Activities will be updated throughout the semester. Changes will be announced in class and provided in writing.

Reminder: Unless otherwise posted, assessments are due **BEFORE class** on the given day.

Covered Materials: You are highly recommended to read/listen/view them the before each class and come with questions to maximize learning.

Gábor: *Data Analysis for Business, Economics, and Policy by Gábor Békés and Gábor Kézdi.*

Nalin: *Health Services Research and Analytics Using Excel® by Nalin Johri.*

Week 1, Jan. 21	**Assessments**
Module 0: Course Introduction Covered Materials: • Course Syllabus • Course Canvas Site In-class Activities: • Self-introduction	
Week 2, Jan. 28	**Assessments**
Module 1: Data Exploration (1) – Origins of Data, Importing Data, Preparing Data for Analysis Covered Materials: • Gábor: Chapter 1 – Origins of Data / Chapter 2 – Preparing Data for Analysis • Nalin: Chapter 1 - Introduction to Healthcare Data and the Role of Excel / Chapter 2 - Working in Excel and Importing Healthcare Data	
Week 3, Feb. 04	**Assessments**
Module 1: Data Exploration (2) – Exploratory Data Analysis, Data Visualization Covered Materials: • Gábor: Chapter 3 – Exploratory Data Analysis • Nalin: Chapter 3 - Identifying, Categorizing, and Presenting Healthcare Data Using Excel	
Week 4, Feb. 11	**Assessments**
Module 1: Data Exploration (3) – Hypothesis Testing (1) Covered Materials:	

• Gábor: Chapter 6 – Testing Hypotheses • Nalin: Chapter 4 - Setting Bounds for Healthcare Data and Hypothesis Testing Using Excel / Chapter 5 - Testing and Comparing Means of Healthcare Datasets Using Excel	
Week 5, Feb. 18	**Assessments**
Module 1: Data Exploration (4) – Hypothesis Testing (2) Covered Materials: • Gábor: Chapter 6 – Testing Hypotheses • Nalin: Chapter 4 - Setting Bounds for Healthcare Data and Hypothesis Testing Using Excel / Chapter 5 - Testing and Comparing Means of Healthcare Datasets Using Excel	
Week 6, Feb. 25	**Assessments**
Module 2: Regression Analysis (1) – Simple Regression Covered Materials: • Gábor: Chapter 7 – Simple Regression • Nalin: Chapter 6 - Checking Patterns in Healthcare Data Using Scatterplots, Correlations, and Regressions in Excel	• Assignment 1 Due
Week 7, Mar. 04	**Assessments**
Module 2: Regression Analysis (2) – Multivariate Regression Covered Materials: • Gábor: Chapter 10 – Multiple Linear Regression • Nalin: Chapter 6 - Checking Patterns in Healthcare Data Using Scatterplots, Correlations, and Regressions in Excel	
Week 8, Mar. 11	**Assessments**
Module 2: Regression Analysis (3) – Modeling Probabilities Covered Materials: • Gábor: Chapter 11 – Modeling Probabilities	
Week 9, Mar. 18	**Assessments**
No Class, Spring Break	

Week 10, Mar. 25	Assessments
Module 3: Python Basics	• Assignment 2 Due • Course Project proposal Due
Week 11, Apr. 01	**Assessments**
Module 4: Predictive Analytics (1) – Machine Learning Basics Covered Materials: • Gábor: Chapter 13 – A Framework for Prediction	
Week 12, Apr. 08	**Assessments**
Module 4: Predictive Analytics (2) – Predict Continuous Variable Covered Materials: • Gábor: Chapter 14 – Modeling Building for Prediction	
Week 13, Apr. 15	**Assessments**
Module 4: Predictive Analytics (3) – Predict Binary Variable (aka Classification) • Gábor: Chapter 17 – Probability Prediction and Classification	• Course Project midterm report Due
Week 14, Apr. 22	**Assessments**
Module 5: How to Lie with Statistics (Causal Inference Basics) Covered Materials: • Gábor: Part IV – Causal Analysis	
Week 15, Apr. 29	**Assessments**
Module 6: Working with Text Data	• Assignment 3 Due
Week 16, May. 6	**Assessments**
Module 7: Course Project Presentation In-class Activities: • Course project presentation	• Course Project slide deck Due

Week 17, May. 13	Assessments
No Class, Final Exam Week (No Final Exam for this course)	• Course Project report Due 05/13 11:59 PM

Reminder: Unless otherwise posted, assessments are due **BEFORE class** on the given day.