HPEM 6380	Integrative Health Enterprise Analytics and Decision Making	Credit Hours: 3

Semester:	Summer - Long	**Year:**	2022
Class Days/Times:	Tues: 6:00 – 9:00 pm	**Class Location:**	On-Line

Instructor of Record:	Michael H. Kennedy, PhD, MHA, FACHE	Associate Professor
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Office Hours:	By appointment.	

Course Description: Given the integration of data, community needs and regulation and policy, this course incorporates the elements of healthcare, public health, health information technology and the health insurance sub-industries to develop a framework and analytic methods to improve efficiency, effectiveness and efficacy of the health industry as a whole. The course will establish an analytic framework, based on data from patients, populations, processes and profitability (4 P's of Health Analytics) utilizing industry, healthcare enterprise and community health data with appropriate tools, methods and approaches to answer community health needs and status, operational, financial and healthcare delivery outcomes questions to support leadership decisions. The course will also include an integrated platform of appropriate analytical and predictive/estimation methods, tools and techniques for enhanced decision making at the strategic and operational levels of the health enterprise for enhanced health status and improved health outcomes of communities served.

Prerequisite: None.   **Co-requisite:** None

Student Learning Outcomes (SLO or "course objective"): Upon successfully completing this course, the student will be able to:
1. Utilize public health data sources to analyze contemporary public health issues. (Program Learning Outcomes [PLO] Links: A.1, A.2, 3.1, 5.1, 5.2)
2. Apply an analytic framework to address population health needs and support informed decision-making. (PLO Links: A.3, 1.1, 2.2, 2.4,)
3. Given a problem statement and healthcare data set, apply the appropriate analytic model. (PLO Links: A.3, 1.1, 2.2, 2.4)
4. Evaluate the results of analysis. (PLO Links: A.10, 1.1, 3.1, 6.1)
5. Communicate the results of analysis. (PLO Links: A.10, 4.2, 6.1)

Course Conduct

Class Activities: This is an on-line course. Reading assignments from the course texts are indicated in the course schedule. Lesson modules review concepts and explore the use of the software associated with this course: Tableau Desktop and JMP Pro. Students will be expected to complete self-study modules posted to Moodle. These modules will include didactic content, videos, software tutorials and assignments. Synchronous meeting opportunities will be scheduled via Zoom. Recorded lectures will be posted by Monday evening.

Assessment/Methods of Evaluation:

Exams. A total of two exams will be administered on-line and proctored. Exams may be any combination of true/false, multiple choice, short answer, essay questions, and short problems.

Assignments. Eight computational assignments will require the students to use course software, employ specific analytical approaches, and provide a synthesis of results. <u>Unless otherwise specified, they are due on Monday by 8:00 am following the week of the assignment. Late assignments will not be accepted.</u>

Class Participation: Class participation is an integral part of the learning process. This course requires substantial and informed student participation. Assimilation of theory and practice is encouraged and expected of all students. At a minimum, being informed requires class engagement and completion of assigned readings and projects. Discussion Forum participation is important and will be considered for the final grade calculation.

Grading

Assignment	Percentage
Assignments 1 - 8	60
Exam 1	20
Exam 2	20
Total	100

Course Grade Scale (percentage): A: 90-100%, B: 80-89%, C: 70-79%, F: < 70%

Linked Program Learning Outcomes:
The student learning outcomes listed on p. 1 address the following MHA Program PLOs:
- A.1   Identify appropriate sources and gather information effectively and efficiently.
- A.2   Appraise data and literature critically that enhances community health.
- A.3   Develop, understand, and use data from performance, surveillance or monitoring systems.
- A.10 Implement a decision-making process that incorporates evidence from a broad analysis that includes uncertainty, risk, stakeholders, and organizational values.

The student learning outcomes listed on p. 1 address the following MPH Program PLOs:
- 1.1   Demonstrate mastery in Biostatistics.
- 2.2   Demonstrate proficiency in the core public health function of assessment.
- 2.4   Demonstrate proficiency in the core public health function of assurance.
- 3.1   Demonstrate proficiency in accessing, interpreting, and applying research data.
- 4.2   Demonstrate proficiency in written communication.
- 5.1   Demonstrate proficiency in use of computer-based systems.
- 5.2   Demonstrate proficiency in using digital technology and other media for addressing other public health issues.
- 6.1   Demonstrate independent and critical thinking skills

Textbooks:

1. Oppenlander, J. E., & Schaffer, P. (2017). Data management and analysis using JMP®: Healthcare case studies. Cary, MC: SAS Institute, Inc. **[Recommended]** [O&S (2017)]

2. Klimberg, R., & McCullough, B. D. (2016). Fundamentals of predictive analytics with JMP®, 2nd ed. Cary, MC: SAS Institute, Inc. **[Recommended]** [K&M (2016)]

Course Content:

Week	Dates	Topics	Sources	Deliverables
1	6/6	Asynchronous Delivery Course Orientation Data, Healthcare Classification Systems and Databases, Visualization of Data Tableau Tutorials		
2	6/13	Synchronous Delivery Mapping Data with Tableau Health Care Cost Associated with Smoking and Cessation (Profitability)	Zoom: 6:00 – 9:00 pm June 14, 2022 Chapters 4 & 5, O&S (2017)	Assignment 1 Due
3	6/20	Asynchronous Delivery Displaying Data with Tableau Visualizing Influenza Activity (Population)	Chapter 8, O&S (2017)	Assignment 2 Due
4	6/27	Synchronous Delivery Creating Dashboards and Story Telling with Tableau Exam 1 Review	Zoom: 6:00 – 9:00 pm June 28, 2022 Choice of Files Employed to Date	Assignment 3 Due

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Week	Dates	Topics	Sources	Deliverables
5	7/4	Asynchronous Delivery Logistic Regression; Acute Kidney Injury (Patients/Processes) Introduction to Predictive Analytics **EXAM 1** (Weeks 1 - 4)	Chapter 6, K&M (2016) Chapter 7, O&S (2017) Chapter 15, Winter- Miner et al. (2015) Online and proctored via ProctorU	Assignment 4 Due
6	7/11	Synchronous Delivery The Algorithms of Predictive Modeling Recursive Partitioning Algorithms (Decision Trees) Acute Kidney Injury (Patients/Processes) Health Care Cost Associated with Smoking and Cessation (Profitability)	Zoom: 6:00 – 9:00 pm July 12, 2022 Chapter 10, K&M (2016) Chapter 7, O&S (2017) Chapters 4 & 5, O&S (2017)	Assignment 5 Due
7	7/18	Asynchronous Delivery Clustering Algorithms Cluster Analysis (Hierarchical & K-means) Health Care Cost Associated with Smoking and Cessation (Profitability)	Chapter 9, K&M (2016) Chapters 4 & 5, O&S (2017)	Assignment 6 Due

	Week	Dates	Topics	Sources
8	7/25	Synchronous Delivery Demonstration (K-nearest Neighbors, Neural Networks, & Text Mining) Review of Tableau Vizs Appointment Wait Times (Patients/Processes)	Zoom: 6:00 – 9:00 pm July 26, 2022 Chapters 11, 12, & 15, K&M (2016) Chapter 9, O&S (2017) **Test Your Knowledge Quiz**	Assignment 7 Due
9	8/1	Asynchronous Delivery **Exam 2** (Weeks 5 - 8)	Online and proctored via ProctorU	Assignment 8 Due

Other Class Policies:

Attendance:
Regular or punctual attendance is expected. If a student misses a class or lab, the student is responsible for obtaining any information distributed during those times. Make-ups are possible only under certain instances (labs cannot be made up). Arrangements for any make-ups and/or missed labs should be discussed directly with the instructor for that day's class.

Participation:
Attendance and participation in class is important. Students will be frequently asked to review concepts and online presentations prior to the scheduled class, so that class time can be used for hands-on activities and work on assignments. Students will often be building Tableau or JMP models with the Instructor.

Academic Honesty:

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is 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.

Cheating
Dishonesty of any kind involving examinations, assignments, alteration of records, wrongful possession of examinations, and unpermitted submission of duplicate papers for multiple classes or unauthorized use of keys to examinations is considered cheating. Cheating includes but is not limited to:

- Using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class.
- Falsifying or inventing any information, including citations, on an assigned exercise.
- Helping or attempting to help another in an act of cheating or plagiarism.

Plagiarism

Plagiarism is presenting the words or ideas of another person as if they were your own. Materials, even ideas, borrowed from others necessitate full and complete acknowledgment of the original authors. Offering the work of another as one's own is plagiarism and is unacceptable in the academic community. A lack of adequate recognition constitutes plagiarism, whether it utilizes a few sentences, whole paragraphs, articles, books, audio-visual materials, or even the writing of a fellow student. In addition, the presentation of material gathered, assembled, or formatted by others as one's own is also plagiarism. Because the university takes such misconduct very seriously, the student is urged to carefully read university policies on Misconduct in Research and Other Scholarly Activity (06/2019). Examples of plagiarism are:

- Submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another.
- Submitting a work that has been purchased or otherwise obtained from an Internet source or another source.
- Incorporating the words or ideas of an author into one's paper without giving the author due credit.

Adding/Dropping:

The official deadline for adding and dropping courses is as published in the academic calendar and Graduate Bulletin (typically the day before Census Day). However, students are strongly encouraged to meet with their graduate advisor or the Program Coordinator prior to adding/dropping courses. Movement into and out of classes after the 4th class day requires approval of the Program Director. Students can drop until mid-semester without a WP or WF. Drops after mid-semester require approval of the Dean. Each student is responsible for their own enrollment status with the university.

Disability Accommodations:

UTHSCT abides by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, which mandate reasonable accommodations be provided for students with documented disabilities. If you have a disability and may require some type of instructional and/or examination accommodations, please contact me early in the semester so that I can provide or facilitate provision of accommodations you may need. If you have not already done so, you will need to register with the Student Services Office (located on the UT Tyler Campus). You may call 903-566-7079 for more information.

Proctored Examinations and Quizzes

ProctorU is a remote proctoring service that allows you to take your exam from the comfort of your home. Simply click on the exam link in Canvas.

Creating a ProctorU account is simple. You can do so by clicking here.

In order to use ProctorU, you will need a high-speed internet connection, a webcam (internal or external), a Windows or Apple operating system, and a government issued photo ID. ProctorU recommends you check your computer equipment prior to your proctoring session to ensure you meet the technical requirements. You can do so via the "Test Your Equipment" icon within your ProctorU

account. Please make sure that you are using the current version of your browser and have downloaded the ProctorU extension available here for Chrome and here for Firefox.

Additionally, please visit and review the test-taker resource center here. You should expect the startup process with the proctor to take about 10 -15 minutes. Please feel free to direct any questions to the test taker support team via the live chat within your account.

References:

Benevento, D., & Rowell, K. S. with Steeger, J. & Cutrell, A. (2015). *The best boring book ever*™ of *Tableau for healthcare* (2nd ed.)*.* Waltham, MA: HealthDataViz.

Grayson, J., Gardner, S. & Stephens, M. L. (2015). *Building better models with JMP Pro®.* Cary, NC: SAS Institute.

Klimberg, R., & McCullough, B. D. (2016). *Fundamentals of predictive analytics with JMP®,* 2nd ed. Cary, NC: SAS Institute, Inc. **[Recommended]** [K&M (2016)]

Kuhn, M. & Johnson, K. *Applied predictive modeling.* New York: Springer.

Murray, D. G. (2016). *Tableau your data! Fast and easy visual analysis with Tableau software*, 2nd ed. Indianapolis, IN: John Wiley and Sons, Inc.

Oppenlander, J. E., & Schaffer, P. (2017). *Data management and analysis using JMP®: Healthcare case studies.* Cary, NC: SAS Institute, Inc. **[Recommended]** [O&S (2017)]

Rowell, K. S., Betzendahl, & Brown, C. (2021). *Visualizing health and healthcare data.* Hoboken, NJ: John Wiley and Sons.

Rowell, K. S. & Cutrell, A. (2013). *The best boring book ever*™ of *select healthcare classification systems and databases.* Waltham, MA: HealthDataViz.

Shmueli, G., Bruce, P. C., Stephens, M. L., and Patel, N. R. (2017). *Data mining for business analytics: Concepts, techniques, and applications with JMP Pro,* 1st ed. Hoboken, NJ: John Wiley & Sons, Inc.

Tukey, J. W. (1977). *Exploratory data analysis.* Reading, MA: Addison Wesley Publishing Company.

Tufte, E. R. (1983). *The visual display of quantitative information.* Cheshire, CT: Graphics Press.

Winters-Miner, L. A., Bolding, P. S, Hilbe, J. M., Goldstein, M., Hill, T., Nisbet, R., Walton, N., & Miner, G. D. (2015). *Practical predictive analytics and decisioning systems for medicine: Informatics accuracy and cost-effectiveness for healthcare administration and delivery including medical research.* Cambridge, MA: Elsevier/Academic Press. Access to this e-book is provided through the UT Health Science Center at Tyler library at: http://www.sciencedirect.com/science/book/9780124116436.

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