

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

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<b>Semester:</b>	Fall	<b>Year:</b>	2024
<b>Synchronous Class Days/Times:</b>	Tues: 6:30 – 9:30 pm	<b>Class Location:</b>	On-Line

**Instructor of Record:** Michael H. Kennedy, PhD, MHA, FACHE                      Associate Professor  
Office: H 241  
Office Phone: (903) 877-1402  
E-Mail: michael.kennedy@uttyler.edu  
Office Hours: Mondays from 6 – 9 pm and 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 Canvas. 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 Wednesday 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.** Twelve assignments will require the students to use course software, employ specific analytical approaches, and provide a synthesis of results. Unless otherwise specified, they are due on Monday by 11:00 pm following the week of the assignment. Late assignments may be penalized 5% and will not be accepted after grading is completed.

**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 - 12	60
Exam 1	20
<u>Exam 2</u>	<u>20</u>
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®, 2<sup>nd</sup> ed. Cary, MC: SAS Institute, Inc. **[Recommended]** [K&M (2016)]

**Special Course Notes:**

Proctoring Notice: The exams in this course will be proctored using ProctorU. You will need to have a webcam and microphone. If you are not able to provide these items, you must contact me by September 30<sup>th</sup> so we can arrange for you to take your exam on campus or via Zoom.

This course is fully online. Students are expected to have access to a reliable, high speed internet connection and a computer capable of accessing Canvas and the Virtual Computer Lab (through VMware). Microsoft Excel and JMP Pro (available by free download or through the Virtual Computing Lab) will be used in class. Technical specifications will be listed in Canvas.

**Course Content:**

Week	Dates	Topics	Sources	Deliverables
1	8/26	<u>Asynchronous Delivery</u> Course Orientation  Data, Healthcare Classification Systems and Databases, Visualization of Data  Tableau Tutorials		
2	9/02	<u>Synchronous Delivery</u>  Mapping Data with Tableau  Health Care Cost Associated with Smoking and Cessation (Profitability)	Zoom: 6:30 – 9:30 pm September 3, 2024  Chapters 4 & 5, O&S (2017)	Assignment 1 Due
3	9/09	<u>Asynchronous Delivery</u> Displaying Data with Tableau  Visualizing Influenza Activity (Population)	Chapter 8, O&S (2017)	Assignment 2 Due  Practicing JMP Due
4	9/16	<u>Synchronous Delivery</u> Creating Dashboards and Story Telling with Tableau	Zoom: 6:30 – 9:30 pm September 17, 2024  Choice of Files Employed to Date	Assignment 3 Due

Week	Dates	Topics	Sources	Deliverables
5	9/23	<u>Asynchronous Delivery</u>  Using Longitude and Latitude to Create Maps  Exam 1 Review	Benevento, D., Rowell, K. S. & Steeger, J. (2021)	Assignment 4 Due
6	9/30	<u>Synchronous Delivery</u>  Creating Highlight Tables and Geocoded Maps with Tableau	Zoom: 6:30 – 9:30 pm October 1, 2024  Benevento, D., Rowell, K. S. & Steeger, J. (2021)	Assignment 5 Due
7	10/07	<u>Asynchronous Delivery</u>  <b>EXAM 1</b> (Weeks 1 - 6)	Online and proctored via ProctorU	Assignment 6 Due
8	10/14	<u>Synchronous Delivery</u>  Introduction to Predictive Analytics  Large language Models/ChatGPT	Zoom: 6:30 – 9:30 pm October 15, 2024  Chapter 15, Winter-Miner et al. (2015)	
9	10/21	<u>Asynchronous Delivery</u>  Logistic Regression; Acute Kidney Injury (Patients/Processes)	Chapter 6, K&M (2016)  Chapter 7, O&S (2017)	Assignment 7 Due

Week	Dates	Topics	Sources	Week
<b>10</b>	<b>10/28</b>	<u>Synchronous Delivery</u> 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: 6:30 – 9:30 pm October 29, 2024  Chapter 10, K&M (2016)  Chapter 7, O&S (2017)  Chapters 4 & 5, O&S (2017)	Assignment 8 Due
<b>11</b>	<b>11/04</b>	<u>Asynchronous Delivery</u> 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 9 Due
<b>12</b>	<b>11/11</b>	<u>Synchronous Delivery</u> Demonstration (K-nearest Neighbors, Neural Networks, & Text Mining)  Review of Tableau Vizs  Appointment Wait Times (Patients/Processes)	Zoom: 6:30 – 9:30 pm November 12, 2024  Chapters 11, 12, & 15, K&M (2016)  Chapter 9, O&S (2017)	Assignment 10 Due   <b>Test Your Knowledge Quiz</b>
<b>13</b>	<b>11/19</b>	<u>Asynchronous Delivery</u> AI in Healthcare	<a href="#">[AI – IBM Free Learning Link]</a>	Assignment 11 Due

Week	Dates	Topics	Sources	Week
<b>Thanksgiving Holiday</b> <b>Monday, November 25 – Friday, November 27, 2024</b>				
<b>14</b>	<b>12/02</b>	<u>Synchronous Delivery</u> <a href="#">[AI – IBM Free Learning Link]</a>	Zoom: 6:30 – 9:30 pm December 3, 2024	
<b>Finals</b>	<b>12/09 – 12/13</b>	<u>Asynchronous Delivery</u> <b>Exam 2</b> (Weeks 8 - 12)	Online and proctored via ProctorU	Assignment 12 Due

### Other Class Policies (Refer to University Policies & Information posted to Canvas for Complete Listing)

#### Attendance:

Regular and punctual attendance at synchronous Zoom class sessions is encouraged. If a student misses a class, the student is responsible for obtaining any information distributed during those times. Synchronous Zoom class sessions will be recorded and posted to Canvas.

#### 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 Specialist prior to adding/dropping courses. July 7<sup>th</sup> is the last day to withdraw from one or more courses. 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.

Proctor U is updating the student proctoring experience beginning on May 3rd (after the Spring semester). Students will be prompted to launch a Proctor U browser instead of installing a Proctor U extension in a Chrome browser.

Support resources for students are being updated and will be communicated as Proctor U makes information available.



### **Class Policy 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.

### ***AI is permitted only for specific assignments or situations, and appropriate acknowledgment is required.***

Some assignments in this course will permit using artificial intelligence (AI) tools, such as ChatGPT or Copilot. When AI use is permissible, it will be documented in the assignment description, and all use of AI must be appropriately acknowledged and cited. When using AI tools for assignments, add an appendix showing (a) the entire exchange (e.g., prompts used), highlighting the most relevant sections; (b) a description of precisely which AI tools were used, (c) an explanation of how the AI tools were used (e.g. to generate ideas, elements of text, etc.); and (d) an account of why AI tools were used (e.g. to save time, to surmount writer's block, to stimulate thinking, to experiment for fun, etc.). Students shall not use AI tools during in-class examinations or assignments unless explicitly permitted and instructed to do so.

### [APA Style Citation Information](#)

**References:**

- Benevento, D., Rowell, K. S. & Steeger, J. (2021). *The best boring book ever™ of Tableau for healthcare* (4<sup>th</sup> 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®, 2<sup>nd</sup> 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, 2<sup>nd</sup> 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>.