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**HPEM 5360                      Quality Improvement and Efficacy in Health                      Credit Hours: 3**

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**Semester:** Fall                      **Year:** 2023  
**Class Days/Times:** Wed; 6:30–9:30 pm                      **Class Location:** Online  
Synchronous classes  
when scheduled

**Instructor of Record:** Michael H. Kennedy, PhD, MHA, FACHE                      Associate Professor  
Lean Six Sigma Green Belt in Healthcare  
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Office Hours: Fridays from 1 – 4 pm and by appointment.

**Course Description:** This course will develop the foundations of quality and process improvement that lead to higher levels of efficacy, efficiency and effectiveness in health organizations and programs. This course will explore the basis of Quality Improvement (QI) consisting of systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups. The methodology of the course will begin with “how things are done now,” considering health care performance as defined by an organization's efficiency and outcome of care, and level of patient satisfaction. Quality is directly linked to an organization's service delivery approach or underlying systems of care throughout the continuum of care. The student will understand that to achieve a different level of performance (i.e., results) and improve quality and efficacy, an organization's current system needs to change. Lastly, this course will focus on a successful QI culture that incorporates the following four key principles: QI work as systems and processes; focus on patients and community groups, especially rural areas; focus on being part of the team; and focus on use of the data and analyses of information.

**Prerequisite:** None.

**Co-requisite:** None

**Student Learning Outcomes (SLO or “course objective”):** Upon successfully completing this course, the student will be able to:

1. Describe the evolution of health care quality improvement. [PLOs 1.4 and 2.4; A.2 and A.8]
2. Employ process analysis tools to examine and improve health care operations. [PLOs 2.2 and 5.3; A.1, A.3, A.5, and A.8]
3. Employ Lean tools. [PLOs 2.2 and 5.3; A.1, A.3, A.5, and A.8]
4. Build and interpret statistical process control charts. [PLOs 2.2 and 5.3; A.1, A.3, A.5, & A.8]
5. Determine process capability. [PLOs 2.2 and 5.3; A.1, A.3, A.5, and A.8]
6. Explain DMAIC as a problem-solving approach within the context of Lean Six Sigma. [PLOs 2.2; A.2 and A.8]
7. Trace the natural flow of patients through a health care practice using Visio. [PLOs 2.2 and 5.1 – 5.3; A.3, A.5, and A.8]
8. Build a value stream map. [PLOs 2.2 and 3; A.1, A.3, A.5, and A.8; B.1, B.2 and B.3]
9. Develop an action plan to improve patient flow. [PLOs 4 and 6; A.10, B.1, B.2 and B.3]

**Course Assessment/Methods of Evaluation:**

Assignments <sup>1</sup>	Points	Percentage
Project: Value Stream Mapping Project	100	20%
Exam 1	100	20%
Exam 2	100	20%
HW 1: Article Review	10	2%
HW 2: Process Analysis Tools (Part 1)	15	3%
HW 3: Process Analysis Tools (Part 2)	15	3%
HW 4: Process Analysis Tools (Part 3)	15	3%
HW 5: Determining Distribution Shapes	15	3%
HW 6: Control Charts (Xbar-R)	15	3%
HW 7: Control Charts (I-MR)	15	3%
HW 8: Control Charts (p, np, c)	15	3%
HW 9: Process Capability	15	3%
HW 10: Applying Control Charts and Process Capability – Example 1	15	3%
HW 11: Applying Control Charts and Process Capability – Example 2	15	3%
Participation Exercises (Gemba Walk, 5 S, Red Ball, Standard Work)	40	8%
<b>Total</b>	<b>500</b>	<b>100%</b>

<sup>1</sup> Assignments are due on Tuesday by 11:00 pm following the week of assignment, unless otherwise noted. Late assignments will be penalized 5% and will not be accepted after grading is completed.

**Course Grade Scale (points): A: 450 to 500, B: 400 to 449, C: 350 to 399, F: < 350 points**

**Linked MPH Program Learning Outcomes:**

The student learning outcomes listed above address the following MPH Program PLOs:

- PLO1 - The student will demonstrate mastery in each of the five core knowledge areas in public health: Biostatistics, Epidemiology, Social & Behavioral Sciences, Health Policy and Management, and Environmental Health Sciences.
- PLO2 - The student will demonstrate proficiency in the four core functions of public health, as well as be able to explain the principles and interrelatedness of the ten essential public health services.
- PLO3 - The student will demonstrate proficiency in using multiple informational resources to gather, analyze, apply and report solutions to public health problems with a special emphasis on rural community health.
- PLO4 - The student will demonstrate proficiency in English communication in both oral (public speaking) and written forms as they pertain to conveying key concepts in public health.
- PLO5 - The student will demonstrate proficiency in using computers and other forms of digital technology and media as they pertain to research, office management and public health issues.
- PLO6 - The student will demonstrate independent and critical thinking skills.

**Linked MHA Program Learning Outcomes:**

The student learning outcomes listed on pp. 1 and 2 address the following MHA Program PLOs:

- PLO A.1 - The student will identify appropriate sources and gather information, effectively and efficiently.
- PLO A.2 - The student will appraise literature and data critically that enhances community health.
- PLO A.3 - The student will develop, understand, and use data from performance, surveillance or monitoring systems.
- PLO A.5 - The student will understand and apply basic statistical methods relevant to public health and health administration practice.
- PLO A.8 - The student will analyze, design, or improve an organizational process, including the use of quality management, process improvement, marketing and information technology principles and tools.
- PLO A.10 - The student will implement a decision-making process that incorporates evidence from a broad analysis that includes uncertainty, risk, stakeholders, and organizational values.
- PLO B.1 - The student will speak and write in a clear, logical, and grammatical manner in formal and informal situations; prepare cogent business presentations; facilitate an effective group process.
- PLO B.2 - The student will receive, process, and respond appropriately to information conveyed by others.
- PLO B.3 - The student will perceive and respond appropriately to the spoken, unspoken, or partly expressed thoughts, feelings, and concerns of others.

**Textbooks:**

Brook, Q. (2022). *Lean Six Sigma & Minitab: The complete toolbox guide for business improvement*, 7<sup>th</sup> ed. Hampshire, UK: OPEX Resources. **[Required]**

Ross, Thomas K. (2014). *Health care quality management: Tools and Applications*. San Francisco, CA: Jossey-Bass. **[Recommended]**

**Supplemental Text:**

Ross, Thomas K. (2021). *Applying Lean Six Sigma in health care*. Burlington, MA: Jones & Bartlett Learning.

**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 25<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:**

Schedule	Assigned Readings
<p><b>Week 1 (Begins Monday, August 21) – Zoom Session</b>  <i>Synchronous Session - Wednesday, August 23 from 6:30 – 9:30 pm</i>  <b>Quality in Health Care.</b></p> <ul style="list-style-type: none"> <li>• Quality guru or serial killer?</li> <li>• What is quality in health care?</li> <li>• Quality pioneers.</li> <li>• Improving quality.</li> </ul>	<p>Ross (2014): Chapter 1</p> <p>Article: Institute of Medicine (IOM), Executive Summary: “To Err is Human.”  <a href="http://www.nap.edu/catalog/9728.html">http://www.nap.edu/catalog/9728.html</a></p>
<p><b>Week 2 (Begins Monday, August 28) – Online</b>  <b>Overview of Other Quality Systems</b></p> <ul style="list-style-type: none"> <li>• Overview – Includes Lean Six Sigma</li> <li>• Quality Improvement (QI) in health care</li> <li>• Roadmaps for improvement</li> <li>• Two jobs</li> </ul> <p><i>Error and Variation</i></p> <ul style="list-style-type: none"> <li>• Insights into the Medical Decision-Making Process</li> <li>• The Structure-Process-Outcome Paradigm</li> <li>• Extensions to Structure-Process-Outcome</li> </ul> <p><b>Assignment: HW 1. Article review</b></p>	<p>Walsh &amp; Shortell (2004)</p> <p>Ross (2014): Chapter 2</p>
<p><b>Week 3 (Begins Monday, September 4) – Zoom Session</b>  <i>Synchronous Session - Wednesday, September 6 from 6:30 – 9:30 pm</i>  <b>Lean</b></p> <ul style="list-style-type: none"> <li>• Lean Overview</li> </ul> <p><i>Lean in Health Care</i></p> <ul style="list-style-type: none"> <li>• Lean in Health Care</li> </ul> <p><i>Patient Flow in Health Care</i></p> <p><i>Introduction of Process Analysis Tools</i></p> <p><b>HW 1 due</b></p>	<p>Reference: Joint Commission – <i>Doing More with Less: Lean Thinking and Patient Safety in Health Care</i></p> <p>Reference: IHI White Paper (2003)</p>
Multi-Week Assignments	Assigned Readings
<p><b>Process Analysis Tools.</b></p> <ul style="list-style-type: none"> <li>• Exploration of seven process analysis tools: 1) Cause-and-effect diagrams; 2) Check sheets; 3) Run charts; 4) Histograms; 5) Pareto charts; 6) Scatter diagrams; 7) Stratification diagrams</li> </ul> <p><b>Assignments: HW 2 - 4.</b>  <i>These topics will be presented asynchronously by recorded video.</i></p>	<p>Ross (2014): Chapter 4</p>

Schedule	Assigned Readings
<p><b><u>Week 4 (Begins Monday, September 11) – Online</u></b>  <i>A Brief History of Lean</i></p> <p><i>Change Management Videos</i></p> <p><i>Lean Glossary</i></p> <p><b>Assignment: Self-Guided Waste Walk Exercise and HW 3</b>            This is a participation exercise turned in as an assignment followed by a discussion during the Week 5 synchronous class.</p> <p><i>Review of Process Analysis Tools (continued)</i></p> <p><b>HW 2 due</b></p>	
<p><b><u>Week 5 (Begins Monday, September 18) – Zoom Session</u></b>  <i>Synchronous Session - Wednesday, September 20 from 6:30 – 9:30 pm</i></p> <p><i>Value Stream Mapping</i></p> <ul style="list-style-type: none"> <li>• Value Stream Mapping Presentation</li> <li>• Value Stream Process Mapping Videos</li> <li>• Value Stream and Process Mapping Metrics</li> </ul> <p><b>Assignment: JMP Intro (Extra Credit)</b></p> <p><b>Assignment: Value Stream Mapping Project</b></p> <p><b>Assignment: 5S Exercise and HW 4</b></p> <p><i>Sorting Out the Mess</i></p> <p><i>Review of Process Analysis Tools (continued)</i></p> <p><b>HW 3 and Waste Walk Exercise Due</b></p>	<p>Brook (2020)</p>
<p><b><u>Week 6 (Begins Monday, September 25) – Online</u></b>  <i>Six Sigma Overview</i></p> <p><b>Assignment: Red Bead Experiment</b></p> <p><i>Getting Things Done</i></p> <ul style="list-style-type: none"> <li>• DMAIC Revisited</li> <li>• <b>DMAIC (Define)</b> <ul style="list-style-type: none"> <li>○ Project Charter – Work on Draft</li> <li>○ House of Quality Exercise</li> </ul> </li> <li>• Other Tools           <ul style="list-style-type: none"> <li>○ Kano Analysis</li> <li>○ CTQ Trees</li> <li>○ SIPOC</li> </ul> </li> </ul> <p><b>HW 4 and 5S Exercise due</b></p>	<p>Brook (2020)</p>

Schedule	Assigned Readings
<p><b><u>Week 7 (Begins Monday, October 2) – Zoom Session</u></b>  <i>Synchronous Session - Wednesday, October 4 from 6:30– 9:30 pm</i></p> <p><i>Getting Things Done</i></p> <ul style="list-style-type: none"> <li>• <b>DMAIC (Measure)</b> <ul style="list-style-type: none"> <li>○ Develop Process Measures</li> <li>○ Collect Process Measures</li> <li>○ Check the Data Quality</li> <li>○ Understand Process Behavior – First Pass Analysis &amp; Determining Distribution Shapes</li> <li>○ Baseline Process Capability and Potential</li> </ul> </li> <li>• Tutorial: Determining Distribution Shapes</li> </ul> <p><b>Assignment: HW 5. Determining Distribution Shapes</b></p> <p><b>Assignment: JMP Extra Credit (Part 1)</b></p> <ul style="list-style-type: none"> <li>• Review Project Charter (Draft)</li> <li>• Exam 1 Review</li> </ul> <p><b>VSM Charter, Marie Kondo DB, and Red Bead Experiment Due</b></p>	<p>Brook (2020)</p>
<p><b><u>Week 8 (Begins Monday, October 9) – Online</u></b>  <i>Exam 1 (Online Exam)</i>  <i>Via ProctorU between 6:00 pm, Wed, Oct 11 – 11:00 pm, Sat, Oct 14</i></p> <p><i>Getting Things Done</i></p> <ul style="list-style-type: none"> <li>• <b>DMAIC (Analyze)</b> <ul style="list-style-type: none"> <li>○ Spaghetti Diagrams</li> <li>○ Brainstorming</li> <li>○ 5 Whys</li> </ul> </li> <li>• Failure Mode and Effects Analysis <ul style="list-style-type: none"> <li>○ IHI site and video</li> </ul> </li> </ul> <p><b>JMP Intro (Extra Credit) due</b></p>	<p>Brook (2020)</p> <p>Ross (2014): Chapter 5 and 10</p>
Multi-Week Assignments	Assigned Readings
<p><i>Statistical Process Control (SPC)</i></p> <ul style="list-style-type: none"> <li>• Theory of variation and control charts for continuous and discrete variables. <ul style="list-style-type: none"> <li>▪ Construct and interpret Xbar and R charts, I-MR charts, p and np charts, and c and u charts</li> </ul> </li> </ul> <p><b>Assignments: HW 6 – 8</b></p> <p><i>Capability Analysis</i></p> <p><b>Assignment: HW 9</b></p>	<p>Brook (2020)</p> <p>Ross (2014): Chapters 6 - 8</p>

Schedule	Assigned Readings
<p><b><u>Week 9 (Begins Monday, October 16) – Zoom Session</u></b>  <i>Synchronous Session - Wednesday, October 18 from 6:30– 9:30 pm</i>  <i>Getting Things Done</i></p> <ul style="list-style-type: none"> <li>• DMAIC (Improve) <ul style="list-style-type: none"> <li>○ Fishbone Diagram</li> <li>○ FMEA (Quick Overview) &amp; (More Detailed)</li> <li>○ FMEA Visual Management (John Shook Blog)</li> <li>○ Visual Board</li> <li>○ I Love Lucy Counterexample</li> <li>○ Pilot Studies (Do of Plan-Do-Study-Act)</li> </ul> </li> <li>• IHI Triple Aim for Populations</li> <li>• Review of Control Charts – Xbar and R Charts</li> <li>• Review Project Charter (Draft)</li> </ul> <p><b>Assignment: HW 6</b></p> <p><b>HW 5 and JMP Extra Credit (Part 1) due</b></p>	<p>Brook (2020)</p> <p>Ross (2014): Chapter 5 and 10</p>
<p><b><u>Week 10 (Begins Monday, October 23) – Online</u></b>  <i>Getting Things Done</i></p> <ul style="list-style-type: none"> <li>• DMAIC (Control) <ul style="list-style-type: none"> <li>○ Standard Work Exercise</li> </ul> </li> <li>• Review of I-MR Charts</li> </ul> <p><b>Assignments – Standard Work Exercise and HW 7</b></p> <p><b>HW 6 due</b></p>	<p>Brook (2020)</p>
<p><b><u>Week 11 (Begins Monday, October 30) – Zoom Session</u></b>  <i>Synchronous Session - Wednesday, November 1 from 6:30– 9:30 pm</i></p> <p><i>Control Charts – p, np, and c-Charts</i></p> <p><b>Value Stream Mapping presentations (Session 1 of 2)</b></p> <ul style="list-style-type: none"> <li>• Review of p, np, and c-Charts; SPC Conclusion</li> </ul> <p><b>Assignment: HW 8</b></p> <p><b>HW 7 due</b></p>	
<p><b><u>Week 12 (Begins Monday, November 6) – Online</u></b>  <i>Capability Analysis</i></p> <ul style="list-style-type: none"> <li>• Review of Capability Analysis</li> </ul> <p><b>Assignment: HW 9/JMP Extra Credit (Part 2)</b></p> <p><b>HW 8 due</b></p>	

### Lean Six Sigma Green Belt for Healthcare Exam

**Students taking this course will be eligible to sit for the Institute of Industrial and Systems Engineers Lean Six Sigma Green Belt for Healthcare Certification Exam.**

**Contact the Instructor regarding examination requirements and fees if you wish to take the Lean Six Sigma Green Belt for Healthcare Certification Exam.**

**Students taking the Lean Six Sigma Green Belt for Healthcare Certification Exam have the option of substituting that score for Exam 2. Take the Lean Six Sigma Green Belt for Healthcare Exam prior to 11:00 pm, Tuesday, December 5<sup>th</sup> if you want the result to substitute for Exam 2**

**Additional resources to help you prepare for the Lean Six Sigma Green Belt in Healthcare Exam are available in a module at the end of the course materials**

Schedule	Assigned Readings
<p><b><u>Week 13 (Begins Monday, November 13) – Zoom Session</u></b>  <i>Synchronous Session - Wednesday, November 15 from 6:30– 9:30 pm</i></p> <p>Value Stream Mapping presentations (Session 2 of 2)</p> <p><b>Assignment: HW 10</b></p> <p>HW 9 due</p>	
<b>Thanksgiving Holiday for Faculty and Students (November 20 – 24 )</b>	
<p><b><u>Week 14 (Begins Monday, November 27) – Online</u></b>  <i>LSS Review</i></p> <p><b>Assignment: HW 11</b></p> <p>Register for the Lean Six Sigma Green Belt in Healthcare Exam with IISE (optional)</p> <p>Exam 2 Study Guide Posted</p> <p>HW 10 and JMP Extra Credit (Part 2) Due</p>	
<b>Exam Week</b>	
<p><b><u>Week 15 (Begins Monday, December 4) (On-Line)</u></b></p> <p>HW 11 due</p> <ul style="list-style-type: none"> <li>• Exam 2 Practice Exam</li> </ul> <p><b>Assignment: Exam 2 (Online Exam)</b>  <i>Proctored via ProctorU. Take the exam between 6:00 pm, Wednesday, December 6 and 11:00 pm, Saturday, December 9, 2023.</i></p>	



## **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 Excel and 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 05.00. 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

### **Withdrawing from Class:**

See University Policies & Information posted to Canvas.

### **Disability Accommodations:**

See University Policies & Information posted to Canvas.

**References:**

- Aft, L. S. (2000). *Work measurement & methods improvement*. New York, NY: John Wiley & Sons, Inc.
- Belson, D. In Hall, R. W. (Ed.). (2006). *Patient flow: Reducing delay in healthcare delivery*. New York, NY: Springer.
- Brassard, M., & Ritter, D. (1994). *The memory jogger II: A pocket guide of tools for continuous improvement and effective planning* (2<sup>nd</sup> ed.). Salem, NH: GOAL/QPC.
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- Clark, D. E., Cushing, B. M., & Bredenberg, C. E. (1998). Monitoring hospital trauma mortality using statistical process control methods. *Journal of the American College of Surgeons*, 186(6), 630-635.
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- Lee, D. S., Tu, J. V., Chong, A., & Alter, D. A. (2008). Patient satisfaction and its relationship with quality and outcomes of care after acute myocardial infarction. *Circulation*, 118, 1938-1945.
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- Mayer, T., & Jensen, K. (2009). *Hardwiring flow: Systems and processes for seamless patient care*. Gulf Breeze, FL: Fire Starter Publishing.
- McLaughlin, C. P., Johnson, J. K., & Sollecito, W. A. (2012). *Implementing continuous quality improvement: A global casebook*. Sudbury, MA: Jones and Bartlett Publishers.
- McLaughlin, C. P., & Kaluzny, A. D. (2006). *Continuous quality improvement in health care* (3<sup>rd</sup> ed.). Sudbury, MA: Jones and Bartlett Publishers.
- Munro, R. A., Ramu, G., & Zrymiak, D. J. (2015). *Certified Six Sigma Green Belt Handbook* (2<sup>nd</sup> ed.). Upper Saddle River, NJ: Pearson Education.
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- Optimizing Patient Flow: Moving Patients Smoothly Through Acute Care Settings*. (2003). IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement.
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**References (continued):**

Walshe, K., & Shortell, S. M. (2004). When things go wrong: How health care organizations deal with major failures. *Health Affairs*, 23(3), 103-111.

Woodcock, E. W. (2009). *Mastering patient flow: Using lean thinking to improve your practice operations* (3<sup>rd</sup> ed.). Englewood, CO: MGMA.

**Note: The Instructor retains the right to change this syllabus.**