USC Viterbi School of Engineering

Healthcare Analytics and Lean
Units: 3
Term—Day—Time: Fall 2015, Fridays, 1:00pm-3:40pm

<u>IMPORTANT:</u>
Location: UPC, Viterbi School of Engineering

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Office Hours:
Contact Info: Email, phone number (office, cell), Skype, etc.

IT Help: N/A
Contact Info: N/A

Course Description

Curious about the healthcare industry? With new trends influencing healthcare, this course explores the application of analytical and lean tools. Participants will learn basic vocabulary specific for healthcare process improvement concepts; gather understanding on lean and quality improvement methodologies; discover how these tools can improve the state of healthcare; and provide a guided approach to solving problems using lean and quality improvement analytics. This course is designed for students in different disciplines, including engineering, business, public health, and medical disciplines, such as pharmacy and dentistry.

Learning Objectives

This course aims to provide participants with an overall understanding of popular healthcare concepts. The course will also provide students with information on current government initiatives such as the *Accountable Care Act* and *value-based purchasing*, and their impact on cost and quality of care. Lean is introduced as a tool to improve patient safety, patient experience and cost control within healthcare organizations. This course will use engineering concepts applied to the service industry, specific to healthcare.

Prerequisite(s): TBA
Co-Requisite (s): None
Concurrent Enrollment: None
Recommended Preparation:
General knowledge of workflows and data analysis

Course Notes
Grading for this course will be based on a group project and individual assessments. The letter grade is assigned on the following scale: 89%-100% -A, 88%-79% - B, 78%-67% - C, 66%-59% - D, <58% - F.

All assignments will be due by 12am on the due date assigned via Blackboard.

One of the classes during the second half of the class will be held at the Health Sciences Campus. Business attire is required on that assigned day. Date will be provided during the first week.

Technological Proficiency and Hardware/Software Required
Not Applicable

Required Readings and Supplementary Materials

Books #1-#3 are required for purchase. Weekly reading assignment will come from these resources. All other resources are reference material and will be used as additional material to support the lectures.

Books
1. A Well-Managed Healthcare Organization, 7th Edition, Kenneth R. White, 2010, ISBN-13: 978-1567933574
2. Lean Hospitals: Improving Quality, Patient Safety and Employee Engagement, 2nd Edition, Mark Graban, 2011, ISBN-13: 978-1439870433
3. The Lean Six Sigma Pocket Toolbox, Michael George et al, 2005, ISBN-13: 978-0071441193

Other Resources
- Healthcare Kaizen: Engaging Front-Line Staff in Sustainable Continuous Improvements, Mark Graban and Joseph Swartz, 2012, ISBN-13: 978-1439872963
- Access to Health Care and Patient Safety: Concepts and Methods, Michelle Taveras Ponce, 2013, ISBN-13: 978-3639519617
- Discovering Statistics Using SPSS, 4th Edition , Andy Field, 2013, ISBN-13: 978-1446249185

Description and Assessment of Assignments

There will be weekly reading assignments, homework and/or project deliverables.

1. Complete assigned readings detailed in the syllabus. Reading assignments should be completed prior to the lecture, unless duly noted. This will provide participants with a better understanding of the topics being covered during the lecture. All discussion questions will be assigned as homework. Check the syllabus for appropriate due date.
2. Discussion questions are short 1-2 page essays on the topic identified. These essays should have at least 3 research sources listed as end notes.
3. Complete reading assignment for *Virginia Mason Case Study*. The *Virginia Mason Case Study* provides participants the ability to view all the topics and concepts applied in a real healthcare environment. The case study can have follow up discussion questions as homework or classroom exercises.
4. Actively participate and contribute to class discussions. Asking probing questions and participating in any workshop will provide points towards the 15% participation percentage of the total grade.
5. A two part team project examining an aspect of healthcare will be a large part of the grade for this course. Teams are to select topics. Some recommended topics are as follows:

    a. Accountable Care Organizations
    b. Bundled Payments
    c. Population Health
    d. Health Exchange Models
    e. Electronic Health Records
    f. Value-Based Purchasing
    g. Predictive Modeling (in healthcare)
    h. Access Management
    i. Patient Access
    j. Lean Six Sigma
    k. Data Management/ Business Intelligence
    l. Other (discuss with Professor)

    Participants will present general topics for research and application of lean methodologies. Topic will be selected at the beginning of the course.

Grading Breakdown
Participants will be graded as detailed below.

Assignment	Points	% of Grade
Participation		15
Midterm Presentation	100	30
Homework		25
Final Project	100	30
TOTAL	**200**	**100**

Assignment Submission Policy

Midterm presentation and Final Project dates will be assigned during the first week of class. Teams will also be determined on the first day of class.

All homework assignments will be due by 12am (midnight) on the due date assigned via Blackboard unless otherwise specified.

Additional Policies

Use of Technology in Classroom
The use of Smart phones and instant messaging during the lecture is not allowed. Scheduled breaks will be provided to students as needed. Computers and tablets are allowed for note taking.

Late Assignments
Late assignments will not be accepted unless it has been previously discussed with professor.

Attendance Expectation
Participants should make all effort to attend all lectures.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates
Week 1 Dates TBA	**Introduction to Healthcare Analytics**		*Select Topic for Project (part 1 and part 2- publishable paper preferred) Due Date- Week 2*
Week 2 Dates TBA	**Foundational Elements of the State of Healthcare**	*White, Chapters 1-4, 13*	***Discussion Questions** to be provided after lecture Due Date- Week 3*
Week 3 Dates TBA	**Applied Quality Tools- forecasting techniques, quality control, simulation methods**	Review these topics by visiting www.KFF.org www.ache.org, www.shs.org,	*Discussion Question-* **How are these tools applied within your project topic? Due Date- During assigned midterm project (week 6 or 7)**
Week 4 Dates TBA	**Applied Analytical Tools: Financial, Operational, Clinical Data Mining** *Guest Speaker #1*	**Research these topics by visiting www.hfma.org www.cms.gov**	**Research information on Healthcare Data Mining and Warehousing, Business Intelligence. Due Date- Week 4**
Week 5 Dates TBA	**Introduction to Lean: Wastes, Value Stream Mapping** *Guest Speaker #2*	*Graban, Chapters 1-4 Additional optional reading- Healthcare Kaizen Chs. 2,3,4*	**Prepare for Student Presentation**
Week 6 Dates TBA	**Midterm Project Presentation**	**Current topic in healthcare**	**Student Presentations Due Date- Week 6**
Week 7 Dates TBA	**Midterm Project Presentation**	**Current topic in healthcare**	**Student Presentations Due Date- Week 7**
Week 8 Dates TBA	**Applied Lean Concepts: Wastes, Kaizen, Employee Engagement**	*Graban, Chapters 6, 10 Additional optional reading- Healthcare Kaizen Ch. 5*	**Discussion Question: Discuss a Kaizen project you would complete in your life Due Date- Week 8**
Week 9 Dates TBA	**Tools: Lean Methodologies- Visual Boards, Poke Yoke, 5S, Standard Work**	*Graban, Chapters 5, 6 Additional optional reading- Healthcare Kaizen Chs. 6,7*	**Discussion Question: How would you modernize the Visual Board? Due Date- Week 9**
Week 10 Dates TBA	**Tools: Applied Lean Methodologies- Workshop**	*Graban, Chapters 7, 8 Additional optional reading- Healthcare Kaizen Ch.8*	**Field Trip- Health Sciences Campus**
Week 11 Dates TBA	**Tools: Lean Six Sigma** *Guest Speaker #3*	*George, Chapters 1,3,5,8,9*	***Discussion Questions** to be provided after lecture Due Date- Week 12*
Week 12 Dates TBA	**Case Study: Lean**	*Virginia Mason Case Study*	**Discussion questions Due Date- Week 13**
Week 13 Dates TBA	**Case Study: Lean**	*Virginia Mason Case Study*	**Prepare for Student Presentation**
Week 14 Dates TBA	**Final Project Presentation**		**Student Presentations Due Date- Week 14**
Week 15 Dates	**Final Project Presentation**		**Student Presentations Due Date- Week 15**
FINAL	**Written Project**		Date: TBD

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu or to the *Department of Public Safety* http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage http://sarc.usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* http://emergency.usc.edu will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.