For syllabus details see page 3 and below.

Fall 2024 – Improving Health Care

ISE 599
Health Care Operations Improvement (4 units)

Wednesdays, 6:40-9:40 PM

Healthcare is changing dramatically and quickly. The pandemic added to the industry's importance and challenges. The world's largest industry and largest employer seeks people to solve its unique problems. Emergencies, high costs, and new treatments demand better systems. This course offers a student the opportunity to learn the latest improvement tools from experts, developers, and researchers in the field. Systems design, data analytics, new services, and technology are changing how hospitals and clinics care for people.

Topics in quality improvement, better teamwork, scheduling, Lean thinking, staffing, technology assessment, informatics, and optimization are covered. With models and simulation, new healthcare system designs can be created. AI, big data, and biotech are rapidly changing the medical world. Implementing information systems, telemedicine, and new technology are addressed in this course.

Course Description:

The highly rated course has been redesigned and covers topics in performance improvement to reduce wait time, improve quality, and implement changes. Students will become familiar with methods and resources for identifying problems and implementing change in a healthcare setting by seeing how it helps people in need. See below for examples.

In addition to lectures, we will have frequent guest speakers providing insights. Past speakers have included hospital CEO's, IT providers, software developers, systems engineers, technology developers, physicians, and government representatives. Organizations such as Kaiser, Cedars Sinai, the Veteran's Administration, Keck Hospitals, and Epic software will speak at the class.

Optional projects at local hospitals will be provided to students, and many employment opportunities have resulted directly from this course. We will use the USC hybrid classroom capabilities to give an equal experience to online and in-person students.

Pre-requisites:
This course is open to all USC students with graduate or upper-division undergraduate standing. Prior experience in health care is not required – but interest is.

Register for ISE or PPD 508, or for more information, please contact
David Belson, Ph.D. belson@usc.edu

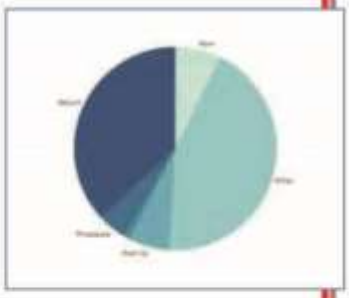
Recent Projects

Examples of recent work done by students:

Supply Chain Improvement – students worked with one of the largest hospitals in the US to improve productivity in the movement of supplies

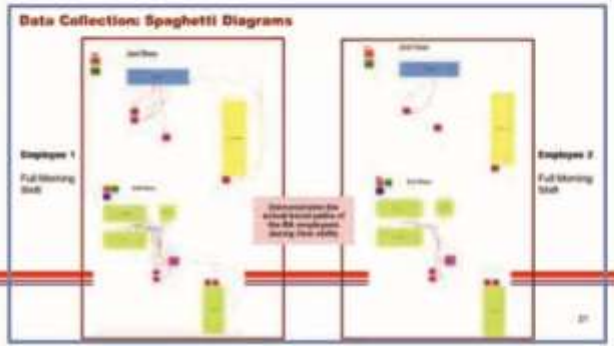
Cancer Care Pathway Improvement – students worked with a clinic system to speed up cancer patients to receive treatment promptly

Use of AI – students used data analytics to help a hospital identify safety trends and locate dangerous problems



Students analyzed clinic overbooking practices statistically to determine the best scheduling policy.

They developed a staff productivity tracking system and improvements at a large senior citizen housing facility.



Draft Syllabus as of 8 19 24

ISE/PPD 508: Healthcare Operations Improvement
Units: 4
Location OHE 100B
Time 6:00 pm Wednesday

Instructor: David Belson, PhD & Irwin Umali
Office: GER 204
Office Hours: TBD
Contact Info: belson@usc.edu ; iumali@proton.me
Teaching Assistant:

Course Description
Strategies to Improve hospital operations, including topics such as supply chains, staffing, informatics, data analytics, and patient flow.

Learning Objectives
This course aims to give students an overview of how healthcare systems improve performance and quality while meeting regulatory, clinical and financial demands. We will draw from concepts in industrial engineering, data science, human factors, and statistics to provide insight into hospitals' multi-disciplinary problems. Read and demonstrate that you have learned about related facility management, patient flow, materials management, work measurement, technology assessment, scheduling, decision support, AI & Machine Learning, and human factors. Students will be able to conduct operations improvement work in various healthcare settings.

Be able to analyze current operations and identify the appropriate tools to improve various systems such as surgery, emergency department, and clinics. Performance excellence ideas such as flowcharting, optimization, data gathering, data analysis, simulation, and other tools will be learned and included in examinations. Demonstrate the Lean method, which is a basic approach. Know about predictive simulation models and real time location tracking. Healthcare settings beyond the hospital, such as outpatient clinics and senior living, will be included, as well as the role of IT and the impact of the Electronic Medical Record on performance.

Grading Breakdown

Homework Assignments (best 4 of 5)	20%
Projects and/or Case studies	25%
Quizzes (3)	20%
Final Examination	20%
Class Participation (classroom and online discussion that adds to the progress of the course)	15%
Total	100%

There will be multiple brief homework assignments & students will be able to exclude the grade on one homework assignment if they wish. There will be three relatively brief quizzes. Please do not request changes to quiz and exam dates, as they are fixed. Class participation includes interaction with the instructor, TA, and other students (e.g., teamwork) as well as the classroom and online discussion forums. Some relevant material may be presented asynchronously online and recorded or initially created at other than normal class time.

Required text: Healthcare Operations Improvement 508 for University of Southern California ePDF, Wiley custom digital text for ISE 508. Pages: 498, 2023, ISBN: 9781394226146
https://www.vitalsource.com/custom/9781394226146
(Subject to change during the semester)

Week	Topics	Chapters from textbook	Assignment
1 Wed 8/28	**Introduction,** healthcare overview, terminology, history of performance improvement and operational excellence, course plan and project team assignments		
2 Wed 9/4	**Patient flow, Process Mapping,** Managing volume, Predictions, Forecasting methods	1,5	
3 Wed 9/11	**Productivity,** Work Measurement, Economic Evaluation, Reengineering of work, Finance issues, Theory of constraints & other tools	6	HW #1 due Quiz 1
4 Wed 9/18	**Lean & 6 Sigma,** Process Management	9,10	
5 Wed 9/25	**Informatics and decision support,** EMRs, Information Systems, Using data sources, Benchmarking	3,4	
6 Wed 10/2	**Performance improvement framework,** Clinical Quality & Patient Safety tools	2	HW #2 due Quiz 2
7 Wed 10/9	**Queuing, Simulation modeling,** discrete event simulation	8	
8 Wed 10/16	**Facility Layout & Location** methods. Facility utilization modeling, optimization, real-time location tracking	14	
9 Wed 10/23	Capacity management, Scheduling, Risk Management	12	
10 Wed 10/30	**Human factors,** Variation, Social determinants of health	Readings	HW #3 due Quiz 3
11 Wed 11/6	**Staffing tools for nursing and other areas.**	11	
12 Wed 11/13	**Supply Chain Management,** Automation, Simulation**,** Materials management, Inventory systems	15, Readings	HW #4 due
13 Wed 11/20	**Clinical Information Systems,** Clinical Decision Support & Performance Management	7,13	
-	Thanksgiving break		
14	**Overall review of course content and hospital projects**		HW #5 due

Wed 12/4			
15 Wed 12/11	**Final Exam: Hospital project presentations** are due by this date		

Read text assignments prior to class; chapters are from the textbook book or otherwise assigned. Additional readings will be assigned and provided. Guest lecturers will be used at selected sessions. In previous sessions, we have had medical doctors, engineers, IT, researchers and senior hospital executives as guest speakers.

Resources:

Optional readings not required but useful sources of additional background:

- Health Care Supply Chain Management: Elements, Operations, and Strategies: Elements, Operations, and Strategies 1st Edition by Gerald (Jerry) R. Ledlow, Karl Manrodt, David Schott
- The Healthcare Supply Chain: Best Practices for Operating at the Intersection of Cost, Quality, and Outcomes: Second Edition – 2017
- Measures of Success: React Less, Lead Better, Improve More Paperback – 2019 by Mark Graban , Donald J. Wheeler (Foreword)
- Patient Flow: Reducing Delay in Healthcare Delivery [Hall, Randolph W. 2006]
- Decision Modelling for Health Economic Evaluation (Handbooks in Health Economic Evaluation) Edition by Andrew Briggs (Author), Karl Claxton (Author), Mark Sculpher (Author)
- Motion and Time Study: Design and Measurement of Work 7th Edition by Ralph M. Barnes (Author)
- Benneyan, James C. "An introduction to using computer simulation in healthcare: patient wait case study." Journal of the Society for Health Systems 5.3 (1997): 1-15.

Assignment Submission Policy
Assignments are due at the beginning of class. Homework assignments will be announced in class. Off-campus students must submit their assignments in time to be received on the day they are due. Assignments should be turned in on time – by the starting time of the class for which it was due. All work is expected to have an easily readable and professional appearance. All examinations are open notes and open book.

Materials, if submitted digitally, should include a filename with the student's name and identification of the item. Such as: "ISE508 HW #2 R Smith" Homework should be clear and show how answers were determined.

Statement on Academic Conduct and Support Systems

Academic Integrity:
The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - 988 for both calls and text messages – 24/7 on call
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL) – 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 740-0411
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call
Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.