ACAD 260/MEDS 250  Introduction to Healthcare Innovations

Units: 4

Meeting Times:
Tuesday and Thursday,
2:00 pm – 3:50 pm (or twice a week for 2 hours)

Location: IYH 211

Instructor:  Dr. Samir Chatterjee, Dr. Armine Lulejian

Office: 3780 Watt Way, Los Angeles, CA 90089
Office Hours: TBD
(General guideline: 1 weekly office hour for each 4 unit class taught.)

Email: samircha@usc.edu; alulejia@usc.edu
Phone:
Instructor will reply within 36 hours during the weekdays.

Course Description

This course is a high level introduction to a dynamic and growing field of health innovations. Students will be provided with introductions to various health innovations, including pathways, technology, techniques, and outcomes. This course will expose students to the latest innovations happening in various segments of the healthcare industry. The purpose of the course is to provide tools for health innovators. On one hand, theoretical and practical understanding of information pathways in the health industries will introduce students to ‘venues’ for health innovators. Topics include brief introductions to different health technologies including electronic medical records, medical imaging, telemedicine, consumer health informatics, artificial intelligence in healthcare among others. The innovation process including design thinking and startup challenges will be discussed. Topics include needs findings, evaluation of existing solutions, stakeholder and market analysis, among others. Case presentations and guest speakers will follow a didactic component to showcase practical applications.

Goals:

1. Make them aware about healthcare system
2. Give them hands-on tools
3. Make them think about innovation
Learning Objectives and Outcomes

By the end of this course, students should be able to:
- Understand EMR/EHR & PHR
- Understand basics of Artificial Intelligence (AI)
- Understand how Virtual Reality (VR) & Augmented Reality (AR) is used in healthcare
- Explain impact of Precision medicine and Personalized medicine
- Differentiate between Health Exchanges and Health Networks
- Explain the processes involved in innovating in healthcare
- Conduct needs assessment and prioritize needs
- Evaluate healthcare markets
- Recognize the major differences between successful innovations and failures; and appreciate both of their places in the process of health innovations
- Discern competitive strategies

Prerequisite(s): None.
Co-Requisite(s): None.
Concurrent Enrollment: None.
Recommended Preparation: None.

Course Notes

This course will be taught using lectures, guest presentations and student-led topic discussions. Active participation is highly suggested.

This course includes didactic components which follow with relevant case presentations. Expert speakers on the topics will be invited as often as possible to provide exposure to students to key leaders in the field.

The course will include both individual and group assignments.

While attendance is not mandatory/graded, it is an integral part of your learning. Thus, coming to class and actively participating engages you in becoming a better learner.

Please read the assignments prior to coming class and be ready to engage in lively discussions with your classmates.

Please complete all assignments by due date prior to class.

Technological Proficiency and Hardware/Software Required
No cells phones permitted during class.

Required Readings and Supplementary Materials

**Additional Readings**
*Please note that copies of these articles will be posted online.*

**Description and Assessment of Assignments**

**Quizzes**
There are 2 quizzes. The quiz will cover topics from week 1 to 5. There will be mostly multiple choice.

**Midterm**
Midterm will be based on the materials covered in the first half of class. It will include both multiple choice and short answer questions.

**Group Projects**
Students will be divided into groups. There will be 2 group projects assigned. These projects are meant to give the students a more hands-on opportunity to explore content and topic learned in class.

Group project #1: Your group will visit a local Hospital site and explore adoption of EHRs and innovation around that. More details will be provided at appropriate times.

Group Project #2: After introducing you to basics of machine learning and the use of RapidMiner tool, each group will conduct analysis using datasets given to you from healthcare industry. You might conduct classification of breast cancer data or develop Neural Network Models to classify/predict cancer from several independent variables. More details will be provided at appropriate time.

**Assignments**
There will be 3 assignments to be done throughout the semester. More details will be provided at due time.

Two of the assignments will have to do with health apps and wearable technology in health. The final assignment is a research essay that you will write on one idea that will change healthcare.

**Grading Breakdown**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>% of Grade</th>
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<tbody>
<tr>
<td>Group Project #1</td>
<td>200</td>
<td>20</td>
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<tr>
<td>Quiz (2)</td>
<td>100</td>
<td>10</td>
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<tr>
<td>Mid-term Exam</td>
<td>200</td>
<td>20</td>
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<tr>
<td>Assignments (3)</td>
<td>300</td>
<td>30</td>
</tr>
<tr>
<td>Group Project #2</td>
<td>200</td>
<td>20</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>1000</td>
<td>100%</td>
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Grading Scale
Course final grades will be determined using the following scale, based on total percentage for your final grade.

A  95-100
A- 90-94
B+ 87-89
B  83-86
B- 80-82
C+ 77-79
C  73-76
C- 70-72
D+ 67-69
D  63-66
D- 60-62
F  59 and below

Assignment Rubrics
Assignments should be written in a 12-point font, double spaced, using one inch margins. For citations, please use American Psychological Association (APA) style guidelines for citing materials used in your assignments.

Submit your assignments in print at the beginning of class and send an email copy to the instructor. Files should be appropriately named using your last name, followed by description of the assignment (ex: LASTNAME_CRITIQUE#)

Assignment Submission Policy
Assignments are due on predetermined dates. Please see the course weekly schedule.

Assignments should be written in a 12-point font, double spaced, using one inch margins. For citations, please use American Psychological Association (APA) style guidelines for citing materials used in your assignments.

Submit your assignments in print at the beginning of class and send an email copy to the instructor. Files should be appropriately named using your last name, followed by description of the assignment (ex: LASTNAME_CRITIQUE#)

For group assignments, only one submission is necessary. Please include names of all group members in the body of the submission.

Grading Timeline
Assignments will be graded and returned to students within the week.

Additional Policies
Late assignments
Assignments that are submitted late will lose 33% of the cumulative grade for that assignment on the first day that an assignment is late. After that, 66% of the cumulative grade for that assignment will be deducted for each day the assignment is late, up to two whole letter grades. Thus, you have 2 days past the due date to submit assignments.

Missed classes
You will not lose points for missing classes, however absenteeism will impact your participation in class. If you’re going to miss a class, as a courtesy, you may choose to let me know. However, it is absolutely not necessary.

Use of technology in the classroom
Cell phones are not permitted to be used during class. Please turn off your phone, or if you must have it on, then please silence it so that there are no disruptions.
• No recording of any kind permitted.
• No computers are to be used during class, unless it is necessary for the course session.
## Course Schedule: A Weekly Breakdown (Deviations may be necessary)

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Topic/Daily Activities</th>
<th>Readings and Homework</th>
<th>Deliverable/Due Dates</th>
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<tbody>
<tr>
<td>Tue</td>
<td>Course overview; Intro. to health innovations</td>
<td>HH Ch 1</td>
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<tr>
<td>Thur</td>
<td>Guest speaker - great healthcare innovations</td>
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<tr>
<td>Week 2</td>
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<tr>
<td>Tue</td>
<td><em>Health Data, Information &amp; Knowledge</em></td>
<td>HH Ch 2</td>
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<tr>
<td>Thur</td>
<td><em>Case presentations: One failure and one success</em></td>
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<td>Assignment #1</td>
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<td>Week 3</td>
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<tr>
<td>Tue</td>
<td>The Innovation Process - Design thinking</td>
<td>Class notes. Keeley Ch 1</td>
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<td>Thur</td>
<td><em>Guest speaker: Presentation of needs in a selected clinical setting</em></td>
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<td>Week 4</td>
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<tr>
<td>Tue</td>
<td>Electronic health records and patient health records</td>
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<td>Thur</td>
<td><em>Health information exchanges</em></td>
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<td>Week 5</td>
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<tr>
<td>Tue</td>
<td>The Ten Types; Network</td>
<td>Keeley Ch 2, 4</td>
<td>Quiz #1</td>
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<tr>
<td>Thur</td>
<td><em>Guest speaker:</em></td>
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<td>Week 6</td>
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<tr>
<td>Tue</td>
<td>Introduction to AI &amp; Machine Learning</td>
<td>HH Ch 22</td>
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<tr>
<td>Thur</td>
<td>Working with RapidMiner tool</td>
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<td>Week 7</td>
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<tr>
<td>Tue</td>
<td>Artificial Intelligence (AI) and Virtual Reality (VR)</td>
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<td>Quiz 3</td>
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<tr>
<td>Thur</td>
<td><em>Guest speaker on AI and Health</em></td>
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<td>Week 8</td>
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<tr>
<td>Tue</td>
<td>Precision medicine and personalized medicine</td>
<td>HH Ch 18</td>
<td>Assignment #2</td>
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<tr>
<td>Thur</td>
<td><em>Case presentations: Examples</em></td>
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<td>Week 9</td>
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<td>Week 10</td>
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<tr>
<td>Tue</td>
<td>Innovation - Process and Product Performance</td>
<td>Keeley Ch 6, 7</td>
<td>Group Project #1</td>
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<tr>
<td>Thur</td>
<td><em>Guest speaker on Health innovation devices - Stuart Karten</em></td>
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<td>Week 11</td>
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<td>HH Ch 17</td>
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<td>Week</td>
<td>Topics</td>
<td>Reading Material</td>
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<tr>
<td>12</td>
<td>Consumer health informatics (23&amp;Me; wearable tech)</td>
<td>Hersh - Ch.12</td>
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<td>Mobile health apps</td>
<td>Hersh - Ch.13</td>
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<td>13</td>
<td>Medical imaging</td>
<td>Hersh - Ch.16</td>
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<td>Innovations in Bioinformatics</td>
<td>Hersh - Ch.17</td>
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<td>14</td>
<td>Startups and Entrepreneurship – needs, markets, venture management, R&amp;D strategy</td>
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<td>Regulatory basics and reimbursements</td>
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<td>15</td>
<td>Guest speaker: Future of health innovation</td>
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<td>Case presentations: Health innovation solutions</td>
<td>Group Project #2</td>
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<td></td>
<td>Case presentations: Health innovation solutions</td>
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<tr>
<td>Finals week</td>
<td>Final</td>
<td>Final Assignment 3</td>
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**Academy Student Attendance Policy**

The Academy maintains rigorous academic standards for its students and on-time attendance at all class meetings is expected. Each student will be allowed two excused absences over the course of the semester for which no explanation is required. Students are admonished to not waste excused absences on non-critical issues, and to use them carefully for illness or other issues that may arise unexpectedly. Except in the case of prolonged illness or other serious issue (see below), no additional absences will be excused. Each unexcused absence will result in the lowering of the final grade by 1/3 of a grade (e.g., an A will be lowered to A-, an A- will be lowered to B+, etc.).

Students remain responsible for any missed work from excused or unexcused absences. Immediately following an absence, students should contact the instructor to obtain missed assignments or lecture notes and to confirm new deadlines or due dates. Extensions or other accommodations are at the discretion of the instructor.

Automatically excused absences normally may not be used for quiz, exam or presentation days. Using an excused absence for a quiz, exam or presentation, such as in the case of sudden illness or other emergency, is at the discretion of the instructor.

In the case of prolonged illness, family emergencies, or other unforeseen serious issues, the student should contact the instructor to arrange for accommodation. Accommodation may also be made for essential professional or career-related events.
or opportunities. All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

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 Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call engemannshc.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call engemannshc.usc.edu/rsvp
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086 equity.usc.edu, titleix.usc.edu
Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421 studentaffairs.usc.edu/bias-assessment-response-support
Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

_The Office of Disability Services and Programs - (213) 740-0776_  
dsp.usc.edu  
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

_USC Support and Advocacy - (213) 821-4710_  
studentaffairs.usc.edu/ssa  
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

_Diversity at USC - (213) 740-2101_  
diversity.usc.edu  
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_  
dps.usc.edu, emergency.usc.edu  
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) 442-120 – 24/7 on call_  
dps.usc.edu  
Non-emergency assistance or information.