Introduction to Medical Informatics (BMIN 7053 / BE 8062 / CS 7053 / PH 8065)

Syllabus – Fall Semester 2019 (3 Credit Hours)

Co-Instructors:

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Class Lecture Time and Location:
Thursday 3:30PM - 6:00PM
MSB 3051
Note: No class on October 10th (Reading Day) or November 28th (Thanksgiving)
Pay garage parking available on site; otherwise use current UC parking or street parking. Surface lot parking is for short term parking only (~15 minutes) per building management. While in the hospital your UC ID card should be visible at all times.

Course Objectives:
By the end of this course, students will be able to:

- Understand the principles and challenges associated with combining information sciences, data, and the healthcare domain
- Discuss the implementation, management, and evaluation of information technology for improved healthcare delivery and research
- Identify career and research opportunities within the informatics field

Course Description:
Biomedical Informatics is an interdisciplinary field that combines knowledge of information sciences and medical sciences to optimize the use and application of biomedical data across the spectrum from the genome to individuals to populations.

This course will present students with an introduction to the field of biomedical informatics through the use of core technologies and data science (computational and analytical methods) and the use of health information technology to improve patient outcomes/healthcare delivery. The course will focus on applications within the medical domain.

Specific topics will include: overview of the field, data standards; security, confidentiality, regional health information exchanges, standards, terminologies, database principles, data marts/data warehouses, interfaces and other topic as related to the healthcare and research setting. Learning objectives will be achieved using a variety of methods including: didactic lectures, group discussions, demonstrations, self-study, student projects, and selected readings from the textbook and peer reviewed journal articles for each topic to develop critical analysis skills and ascertain real world applications.

Course Scope:
The course is designed to build knowledge about informatics in healthcare operations and clinical/translational research. It is not a course to teach software development, database design or use of specific applications although some introduction to such resources are included.

Required Textbooks:

- Health Informatics: Practical Guide Seventh Edition, William R. Hersh and Robert E. Hoyt, ISBN-13: 978-1387642410

Textbook readings: students are required to read select sections of textbook chapters. Some of the quiz and test questions will be taken from this material:
Midterm: Chapters 1-7, 17, and 22
Final (comprehensive)l: Chapters 1-11, 14, 16, 17, 19, 20, 22
Note: Due to guest speakers limited schedules it is not always possible to align their content with assigned reading.

Grading will be based upon the following point system:
10% - Class attendance (100 points)
10% - 10 online quizzes (100 points)
5% - Discussion board posts (50 points)
25% - Team-based oral presentation (250 points)
25% - Midterm (250 points)
25% - Final exam (250 points)
For a maximum of 1000 points

Details about grading:

Attendance (100 points, 10% of total grade)
Students are expected to attend each class. Students with no more than one unexcused absence will receive the maximum of 100 points. Ten points will be deducted for each additional unexcused absence. Reasonable excuses will be permitted with prior instructor approval, although students are responsible for all material during missed classes.

Discussion Board Posts (50 points, 5% of total grade)
Throughout the semester, students will individually respond to three prompts to encourage peer interaction. Each initial discussion response will be due by 11:59 pm the Monday after the class session when assigned and two follow-up responses to peers will be due by 11:59 pm the following Wednesday. Students will receive 10 points for the first assignment and 20 points each for the second and third assignments for a maximum of 50 points. To receive full credit, responses must directly answer each part of the assigned prompt, and should use generally acceptable vocabulary, with minimal spelling or grammatical errors.

Team-based Oral Presentation (250 points, 25% of total grade)
The oral presentation is a topic in medical informatics chosen by the student which will be presented in greater detail than allowed by the text or class lectures. Although it is permissible for students to present a topic related to their work in a lab or professional setting, it is not acceptable to reuse work that has previously been presented in a conference setting.

The topic needs to be determined by the end of class during week four. Students will present their topics (approximately 15-20 minutes) to the class during the last two classes and field questions. Maximum points will be given to well researched, well organized presentations that stay within the time limit. Each team member will be evaluated individually based on their portion of the presentation. Each team member should present for approximately the same amount of time as the other team members. Prerecorded audio or video such a s YouTube are not allowed.

Quizzes (100 points, 10% of total grade)
Ten online quizzes will be made available throughout the course to test and reinforce material from the textbook and previous lectures. Students are free to use any resources when taking the quizzes, but students should work alone. The quizzes will be available between class sessions and will typically consist of 5-10 questions with each quiz being worth 10 points. Quiz answers will be reviewed in the class session after they are taken and may reappear on the midterm or final exams. Quizzes must be completed within 30 minutes of time once initiated.

Midterm (250 points, 25% of total grade)
The midterm exam will cover material from the chapters 1-7, 17, and 22 of the textbook as well as all lectures and quizzes covered on the dates prior to the midterm. The test will consist of 50 multiple choice, true / false, and matching style questions and will be taken in class. If a student has a reasonable excuse for being unable to attend the class session, arrangements may be made to take the exam before it is given in class.

Final Exam (250 points, 25% of total grade)
The final exam will cover material from chapters 1-11, 14, 16, 17, 19, 20, and 22 of the textbook as well as all lectures and quizzes covered throughout the course with heavier representation on material covered after the midterm. The test will consist of 50 multiple choice, true / false, and matching style questions and will be taken during the final class session. If a student has a reasonable excuse for being unable to attend the class session, arrangements may be made to take the exam before it is given in class.

Grading Scale:

A	94-100 (≥935 points)
A-	90-93 (895-934 points)
B+	85-89 (845-894 points)
B	80-84 (795-844 points)
B-	75-79 (745-794 points)
C+	70-74 (695-744 points)
C	65-69 (645-694 points)

Academic Integrity Policy:
The University Rules, including the Student Code of Conduct, and other documented policies of the department, college, and university related to academic integrity will be enforced. Any violation of these regulations, including acts of plagiarism or cheating, will result in a failing grade in the course.

Accommodations Policy:
If you have any special needs related to your participation in this course, including identified visual impairments, hearing impairments, physical impairments, a communication disorder, and/or a specific learning disability that may influence your performance in this course, you should meet with the instructor to arrange for reasonable provisions to ensure an equitable opportunity to meet all the requirements of this course. At the discretion of the instructor, some accommodations may require prior approval by Disability Services.

Tentative Lecture Topics, Reading, and Assignment Schedule

Date	Module	Time	Topic	Presenter	Reading	Assignment
29-Aug	1	3:30	Syllabus Review	Eric Hall	Chapter 1, 2	Post 1 (Topics of Interest) Quiz 1
		4:45	Overview of Medical Informatics	Brett Harnett		
5-Sep	2	3:30	Clinical Informatics Applications	Phil Hagedorn	Chapter 22	Quiz 2
		5:00	Review Previous Quiz and Reading			
		5:20	Common Mistakes in Applications of Data Science to Healthcare	Gowtham Atluri		
12-Sep	3	3:30	Artificial Intelligence and Machine Learning	Judith Dexheimer	Chapter 3, 4	Quiz 3
		4:45	Data Management for Clinical Research & TriNetX Demonstration	Brett Harnett		
		5:45	Review Previous Quiz and Reading			
19-Sep	4	3:30	Hands on FHIR	Kevin Dufendach	Chapter 5	Quiz 4
		4:45	Clinical Decision Making	Eric Hall		
		5:45	Review Previous Quiz and Reading			
		6:00	**Group Presentation Topic Due**			
26-Sep	5	3:30	Health Information Exchange	Alex Vaillancourt	Chapter 6, 17	Quiz 5
		4:45	Telehealth	Charles Doarn		
		5:45	Review Previous Quiz and Reading			
3-Oct	6	3:30	Data Visualization and Analytics	Michael Fry	Chapter 7	Post 2 (Review Feedback) Quiz 6
		4:45	**Team Project Critical Review**	Student Teams		
		5:45	Review Previous Quiz and Reading			
10-Oct	-	-	Reading Day	-	Review for Midterm	None
17-Oct	7	3:30	Decision Support	Mark Eckman	Chapter 8	Quiz 7
		4:45	**Midterm (Chapter 1-9, 22)**			
24-Oct	8	3:30	Epic Hyperspace Demo ***3120 Burnet Avenue, Suite 105***	Suzanne Burgei	Chapter 9, 14 Case Review Set 1	None
31-Oct	9	3:30	Data Standards	Brett Harnett	Case Review Set 2	Quiz 8
		4:45	Review Previous Quiz and Reading			
		5:00	Case Review	Eric Hall		
7-Nov	10	3:30	**Class Led Case Study Review**	Students	Recent JAMIA Article	Post 3 (Journal Article Summary)
		5:45	Review Previous Quiz and Reading			
14-Nov	11	3:30	Deep Learning and Imaging Informatics	Surya Prasath	Chapter 10, 11, 16	Quiz 9
		4:45	HIPAA, Privacy, IRBs, and Ethical Issues	Brett Harnett		
21-Nov	12	3:30	Integrating NLP and Informatics Workflows	John Pestian	Chapter 19, 20	Quiz 10
		4:45	Integrating Data for Population Health	Eric Hall		
		5:45	Review Previous Quiz and Reading			
28-Nov	-	-	Thanksgiving	-	Review for Final	None
5-Dec	13	3:30	**Team Presentations**	Student Teams	Review for Final	None
12-Dec	14	3:30	Final Exam		None	None