

**Introduction to Medical Informatics**  
**(BMIN7053, CS7053, BE8062, MEDS2061)**  
Syllabus – Fall Semester 2022 (3 Credit Hours)  
Department of Biomedical Informatics

**Graduate Section Co-Instructors (BMIN7053, CS7053, BE8062):**

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**Undergraduate Section Instructor (MEDS2061):**

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Office hours by appointment

**Class Lecture Time and Location:**

MSB E 255

Thursdays 3:30 – 6:00PM

August 25 – December 8, 2021

Note: No class on November 24<sup>th</sup> (Thanksgiving Day)

[UC Return to Campus link](#)

**Course Learning 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 molecules 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 and clinical/translational research. It is not a course to teach software development, database design or use of specific applications although some introduction to resources is included.

**Required [Textbook:](#)**

Health Informatics on FHIR: How HL7's New API is Transforming Healthcare  
 ISBN-13: 978-3030066550  
 ISBN-10: 303006655X

Textbook readings: students are required to read select chapter of textbook. Some of the quiz and test questions will be taken from this material. See details below.

Note: Due to guest speakers busy schedules it is not possible to align their content with assigned reading.

**Grading will be based upon the following point system:**

- 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)

Grade	Percentile	Graduate (1000 points)	Undergrad (750 points)
A	94-100	≥935 points	≥701 points
A-	90-93	895-934 points	671-700 points
B+	85-89	845-894 points	633-670 points
B	80-84	795-844 points	596-632 points
B-	75-79	745-794 points	558-595 points
C+	70-74	695-744 points	521-557 points
C	65-69	645-694 points	483-520 points

Students are expected to attend each class. Minimal excused absences will be accepted although students are responsible for all material during missed classes.

The oral presentation is a topic chosen by the student relevant to the class. The topic needs to be determined by the end of week four. Students will present their topics (approximately 15-20 minutes) to the class in the last two classes and field questions.

**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, 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, Graduate Student Only)

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 should be chosen 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 as YouTube are not allowed. Of note, although undergraduate students do not need to present, they will need to join the class the listen to the presentations.

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 but 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, 3, 5, 7, 8]** 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 [4, 9, 10, 11]** 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.

**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 Schedule (subject to change by course instructors)**

Date	Wk	Topic	Textbook	Instructor / Guest
25-Aug	1	Course Introduction – Review of Textbook	None	Harnett, Dexheimer, Wus
		Overview of Medical Informatics		
1-Sep	2	Data Standards	Ch. 1	Brett Harnett
		Artificial Intelligence and Machine Learning		Judith Dexheimer
8-Sep*	3	The Health Landscape and UDS Mapper (C)	Ch. 3	Michael Topmiller
		Telehealth and the Data Spectrum (C)		Charles Doarn
15-Sep **	4	Geocoding and DeGAUSS (C)	Ch 5.	Cole Brokamp
		The Electronic Health Record (C)		Andy Spooner
22-Sep	5	Clinical Informatics Applications (C)	Ch. 7	Phil Hagedorn
		HIPAA, IRB and Ethics		Brett Harnett
29-Sep	6	NLP	Ch. 8	Judith Dexheimer
		Textbook review		Brett Harnett
6-Oct	7	<b>Midterm Exam</b>		
13-Oct	8	Decision Support and BPAs	Ch. 4	Judith Dexheimer
		COVID-19 & Public Health Data (C)		Beck & Hartley
20-Oct	9	The Health Collaborative (C)	Ch. 9	Alex Vaillancourt
		Data Management for Clinical Research/TriNetX		Brett Harnett
27-Oct	10	UC Health Epic Hyperspace Demo/Training (C)	Ch. 10	Meghan Miller, Bryan Kelly
		ETL and Clinical Data for Research (C) (4:45ish)		Jason Keller
3-Nov	11	SMART on FHIR (C)	Ch. 11 and Case Study	Kevin Dufendach
		Security Considerations in Medical Informatics (C)		John Zimmerly
		<i>Team Project Reveals</i> (~5 minutes per team)		Students
10-Nov	12	Clinical Workflow Analysis	None	Danny Wu
		Visual Analytics		Danny Wu
17-Nov	13	<i>Student Presentations &amp; Book Review (highlights)</i>	None	Student Teams
24-Nov		No Class - Thanksgiving		
1-Dec	14	<i>Student Presentations*</i>	None	Student Teams
8-Dec	15	<b>Final Exam</b>		
*Dr. Dexheimer Out ** Professor Harnett Out				