FMIS 4220 Medical Informatics

Class Information

Term	Fall 2016	Days	MWF
Section	001	Time	9:00-9:50 am
Location	LSBE 237		

Instructor	Nik R. Hassan
Office	LSBE 335Q
Email	nhassan@d.umn.edu
Course Homepage	The course is using a pilot Canvas site as its homepage. Type umn.instructure.com and log in using regular UMD Internet ID and password. The course URL is: https://umn.instructure.com/courses/730 or via your MyU Portal A backup Moodle site is available in case we encounter any problems.
Instructor Homepage	www.d.umn.edu/~nhassan
Office phone	(218) 726-7453
Office Hours	2:00-3:00pm Mon/Wed, 11:30am-12:30pm Tues/Thurs or by appointment

Course Information

Information technology (IT) is taking center stage in the efforts to reform healthcare in the United States. The Obama-Biden healthcare reform plan depends on the effective adoption of state-of-the-art health information technology systems that will improve efficiency and lower costs. President Obama expects to save $77 billion each year from the adoption of IT through improvements such as reduced hospital stays, avoidance of duplicative and unnecessary testing, more appropriate drug utilization, and other efficiencies. The goal of this course is to introduce students to such "health IT" initiatives that are expected to accomplish all these goals. The course will describe how health IT help providers better manage clinical practice, reduce medical errors, and improve quality of patient care and safety by supporting evidence-based and patient-centric medicine, monitoring of patient outcomes and adverse events, informing and empowering consumers to take better care of their health. To encourage the implementation of these systems, President Obama signed into law on February 17, 2009 the Health Information Technology for Economic and Clinical Health (HITECH) Act. This act, among others, provides funding for hospitals and physicians for the adoption of health information technology for as much as $19 billion in the next four years based on the criteria of "meaningful use" of IT. On December 30, 2009, the Centers for Medicare & Medicaid Services (CMS) and the Office of the National Coordinator for Health IT (ONC) issued proposed regulations on the definition of meaningful use and the initial set of standards, implementation specifications, and certification criteria for electronic health records (EHR) technology. The FMIS 4220 Medical Informatics course is designed to introduce students to these efforts and enrich their portfolio of working knowledge toward a high-level understanding of the health IT domain, medical informatics and its myriad applications in healthcare. Although this course is not entirely a technical course, it will take

advantage of the technical skills gained in pre-requisite computing courses such as FMIS 2201 and will build an appreciation of the technical requirements for a successful medical informatics infrastructure.

Course Resources

Textbooks	Pamela K. Oachs, Amy L. Watters. (2016) *Health Information Management: Concepts, Principles and Practice* (5th Edition). Chicago IL: AHIMA Press. ISBN 9781584265146.
	MacDonald, Matthew (2013) *Access 2013 The Missing Manual*, Sebastopol, CA: O'Reilly/Pogue Press (Required) ISBN-13: 978-1449357412 (I'm requiring this because most students are not familiar with using databases. If however you are already an advanced MS Access user, you can do without it. You can get it from Amazon for less than $10)
Course Prerequisites	FMIS 2201 IT in Business (Required)
Technology Requirements	This course combines knowledge of information technology (IT) in the context of health care. Therefore, knowledge of both, especially how medical and health care data is managed, is required.
	Laptop with Windows and MS Access 2016 (or 2013) This course requires the use of Microsoft (MS) Access 2016 (You can also get by with MS Access 2013). MS Access 2016 is one of the programs in the MS Office 365 Pro Plus suite. Note that the MS Office 2013 Home or Student version does not include MS Access. If this class is taught in LSBE 237, MS Access is already available on the lab PCs. However, having MS Access on your laptops will be more convenient especially if you're completing your work off campus. It is only available on a Windows platform and provides a gentler learning curve or learning about databases. MS Office 365 Pro Plus is available for free to all registered students ($100/yr value) from the OIT UMD site (http://it.umn.edu/services/all/computer-device-support/purchasing/software/index.htm)
	Because we will be using Windows applications such as MS Visio and MS Access, the preferred platform for the laptop is the Windows 10 platform. If you own a Mac, the Windows operating system can be installed in a virtual Windows environment on Intel-based Mac computers using software like VirtualBox (freeware) from Oracle (https://www.virtualbox.org/), VMware Fusion or Parallels (about $40 each, also available at the UMD Computer Corner). The LSBE Technology Program can help you get set up with any of these virtual Windows environments.
	Dreamspark LSBE has an agreement with Microsoft to provide software free of charge to registered students through a program called Dreamspark. If you are a Mac user, you can download Windows 10 installation files

	from Dreamspark. The installation files are required before setting up the virtual Windows environment on the Mac. You should be receiving an email from University of Minnesota with the subject "An Account has been created for you …" with information about how to log into the Dreamspark program. If you lost or deleted the email or haven't received it (try searching using "Dreamspark"), send an email to Vickie Almquist-Minko (valmquis@d.umn.edu) with the subject "Dreamspark Access for FMIS 4220 - your Internet ID") to request access to the Dreamspark program. **MS Visio 2013** MS Visio 2013 is a drawing and modeling program also available for free via the Dreamspark program. We will be using MS Visio 2013 to analyze and design healthcare business processes for homework and the semester project, so make sure you have installed it on your laptop if you like to work on the laptop in class. Visio 2013 is available on the PCs in the lab. I will be using Visio to demonstrate the importance of understanding business processes in medical informatics.
Course Objectives	**Student Knowledge and Comprehension** 1) A clinical executive-level appreciation for the convergence of three critical forces in medical informatics: computing, communications, and content with a focus on why medical informatics is critical to health care. 　a) Reasons for and benefits of using information and communication technologies (ICT) in healthcare 　b) General characteristics of health information systems. 2) Knowledge of the current state and future trends in computer and communications technology, and database management systems, both general and health-related. 3) Value of high-quality data for successful patient and institutional management 4) Nature of medical data and the electronic medical records (EMR) 　a) Structure, design and analysis principles of the health record including notions of data quality, minimum data sets, general applications of the electronic health record 5) Knowledge of standards, coding and classifications in medical informatics. 6) Understand the importance of business process management in enhancing healthcare quality and supporting medical informatics 7) Regulatory, ethical and privacy standards in health care and how medical informatics maintains them. 8) An overview of the informatics tools and systems in healthcare and their associated medical departments and clinical support systems. 　a) Need for organizational information strategy and trained personnel 　b) Decision-making principles, decision-support tools, and guidelines

	9) Knowledge of telemedicine, Internet-enabled applications and other future technologies **Application and Analysis** 1) Build an electronic medical health record to store health care data using Microsoft Access 2) Develop a specific medical informatics application using Microsoft Access 3) Assess, analyze, design and build healthcare business process maps and diagrams 4) Ability to use health and medical coding systems **Synthesis and Evaluation** 5) Develop the skills associated with critical and analytical thinking, skills such as the ability to analyze and apply information, to form opinions on the basis of knowledge and information, and to synthesize information from a variety of sources 6) Evaluate the value of a medical informatics vendor solution
Grading Policy	**Quizzes and exercises (Ex#1-Ex#10)** The intent of these multiple choices quizzes and exercises are to encourage students to study class material and to reinforce learning. Several hands-on exercises help the student get familiar with complex technologies or techniques. If the exercise are quizzes, the questions are representative of professional HIM exams and tend to be challenging so they are open book. They are due usually on Wednesdays by midnight. Students are allowed two attempts on quizzes 10 Exercises, 10 points each – 100 points **Homework Assignments (HW#1-HW#5)** The goal of these homework assignments is to assess the student's understanding and application of the material covered in class. The homework assignments involve research to collect the latest developments in medical informatics, which may not be completely covered in class. They test the student's ability to collect relevant and useful information through research, observation, and case studies found in databases and from the Internet, and the organization of such data in effective short reports. The second half of most assignments will be MS Access tasks that prepare the students towards completing the semester project. Most of the MS Access tasks can be completed during the tutorials in class and are due usually on Friday by midnight. 5 Assignments, 60 points each -- 300 **Exams** Mid-term Multiple Choice -- 100 points Mid-term MS Access hands-on test – 100 points The goal of the mid-term is to test each student's comprehension of materials covered. Final short answer comprehensive exam -- 100 points The goal of the final exam is to test the ability of the student to apply and communicate all that they have learned in writing **Group Semester Project and Presentation**

	Students will be grouped into teams and each team will build a working database application that will demonstrate a specialized medical informatics function. A list of medical informatics database applications will be provided for each student to select from. The same group will also present on their chosen topic after Thanksgiving (100 pts). The project deliverables for the database application will take the form of three submissions, (1) the project proposal and prototype (100 pts), and (3) the final project (100 pts). Instructions for each submission will be provided 300 points **Summary Grade Breakdown** Quizzes: 100 Homework Assignments: 300 Exams: 300 Group Presentation: 100 Group Project: 200 TOTAL 1000 points Extra credit up to 50 pts for excellent group project application
Scoring Elements	91.5-100 = A 89.5-91.4 = A- 86.5-89.4 = B+ 82.5-86.4 = B 79.5-82.4 = B- 76.5-79.4 = C+ 72.5-76.4 = C 69.5-72.4 = C- 66.5-69.4 = D+ 60-66.4 = D Less than 60 = F
Make Up Policy	There will be no make-up assignments or tests unless circumstances are extreme (e.g. death in the family). All make-up exams must be scheduled and completed within one week after return to class or a grade of "F" will be assigned.
Grade Appeal	Must be written in standard business format and submitted within one week after test grades have been handed out to class. Verbal discussions will not substitute for this required method of requesting grade review or recomputation.
Student Responsibility	1. If the student misses class, it is her or his responsibility to get copies of any material handed out in class from student colleagues, not from the instructor. The instructor can only assume responsibility for the initial distribution of material, and cannot inevitably ensure each student's ultimate receipt of each class handout or returned test grade sheets. 2. Attendance: Students are expected to attend all scheduled class meetings, unless excused by the instructor. Excessive absence will result in lowered grades from original test results. Students may NOT expect to pass the course merely by achieving passing test grades without complete class attendance, except for excused absences. 3. The instructor will not use class time to discuss problems or grades, tests, papers, or discussions. These subjects should be treated more thoroughly in written documentation. These written communications should be respectful, professionally constructed, and should reflect clearly the integrity and ethics of

		the student.		
Academic Dishonesty		All forms of academic dishonesty will result in a course grade of Failure (F). Students caught copying other students' assignment or showing or cheating will be asked to leave the class and will not be permitted to attend future class meetings for the remainder of the semester.		

Week	Date	Topics	Readings (Health Info Mgmt-HIM text, M-MS Access MacDonald text)	Assignments Due
1	8/29	Introduction & Course overview	Syllabus	
	8/31	Getting familiar with resources and technology. Moodle 2.6 and using MS Access 2013	Read the BRIEF report (not the full report) "To Err is Human: Building a Safer Health System" by the Committee on Quality of Health Care in America, Institute of Medicine, 2000. (0.5 hr)	
	9/2	Why Medical Informatics? Review Ex#2 FMIS 2201 Database processing refresher Computer Bits and Bytes, Records and Files Why Databases?	M-Chapter 1, 2 & 3 Slides-FMIS 2201 Database processing review	
2	9/5	Labor Day		
	9/7	Moving from information to knowledge Creating relationships in databases Creating tables and a database In-class Ex#1	M-Chapter 5	**Ex#1 Build your first database**
	9/9	Health Care problems Introduction to Medical Informatics The Health Information Management Profession	Instructor Slides-Introduction to Medical Informatics Read HIM-Chap 1 The US Healthcare Delivery System	
3	9/12	Health Care Context Review HW#1 Part A & B	Read HIM-Chap 1 The US Healthcare Delivery System Instructor Slides – Health Care Context	
	9/14	Health care context presentations		**Ex#2: Health Care Context PowerPoint Presentations**
	9/16	Review HW#2 Part A Creating customized forms Review HW#2 Part B	M-Chapters 12 & 13	**HW#1 Due (1 hr)**
4	9/19	Health care data management	Instructor Slides-Health care data management	

			Read HIM- Chap 3 Data Governance and Stewardship	
		9/21	Maintaining data quality using the database and forms Review HW#3 Part A	M-Chapters 4 Review the article from the National Committee on Vital and Health Statistics' website entitled Core Health Data Elements: Report of the National Committee on Vital and Health.	**Ex#3 Due Open Book Online Quiz**
		9/23	Meaningful Use and technologies to support medical informatics Review HW#3 Part B Review Ex#4	Refer to healthit.gov site for meaningful use program Read HIM-Chap 12 Health Information Technologies (pp. 343-367)	**HW# 2 Due Encounter Form (2 hr)**
5		9/26	Classification systems, clinical vocabularies and terminology	Instructor Slides- Medical Informatics Standards Read HIM- Chap 5 Clinical Classifications, Vocabularies, Terminologies, and Standards	
		9/28	Student presentations	Read HIM-Chap 12 Health Information Technologies (pp. 343-367)	**Ex#4 Due Presentation of supporting IT**
		9/30	Classification systems, clinical vocabularies and terminology	Instructor Slides- Medical Informatics Standards Read HIM- Chap 5 Clinical Classifications, Vocabularies, Terminologies, and Standards	**HW#3 Problem List and Forms (2-3 hrs)**
6		10/3	Mid-term exam Review	Mid-term review sheet	**Ex#5 Online Quiz Due**
		10/5	**MULTIPLE CHOICE MID-TERMS**		
		10/7	**MEDICAL DATA MANAGEMENT MIDTERMS** (MS Access)		
7		10/10	Exam feedback Review HW#4 Part A & B		
		10/12	Querying the database Review Semester Project Content and Structure of Health Records	M-Chap 6, 7 & 8 Instructor Slides-Electronic Health Records Read HIM-Chap 4 Health Record Content and Documentation	**Ex#6 EHR Quiz**
		10/14	Electronic Health Record Systems Health Information Exchanges Review Semester Project – organize teams	Instructor Slides-Electronic Health Records Read HIM-Chap 12 Health Information Technologies (pp. 363-382) Read HIM Slides-Chap 15 Health Information Exchanges (HIE)	**HW#4 Completing your EHR (2-3 hrs) Organize into Project Teams**

8	10/17	Project management and business process management (BPMN) Review HW#5	Instructor slides-BPMN and Healthcare Read HIM Slides-Chap 13 HIT Strategic Planning Read HIM Slides-Chap 27 HIT Project Management	
	10/19	Project management and business process management (BPMN) Analyzing and designing processes using Visio	Instructor slides-BPMN and Healthcare Read Business Process Modeling Tutorial	
	10/21	Project management and business process management (BPMN)	Instructor Slides-Process and Project Management M-Chap 15&16 Macros M-Chap 17-Automating tasks with VBA	**HW# 5 (2-3 hrs)**
9	10/24	Healthcare analytics	Instructor Slides-Healthcare analytics Read HIM Slides-Chap 16 Healthcare Statistics HIM Slides-Chap 17 Healthcare Data Analytics	
	10/26	Healthcare analytics	Instructor Slides-Healthcare analytics Read HIM Slides-Chap 16 Healthcare Statistics HIM Slides-Chap 17 Healthcare Data Analytics	**Ex#7 Analytics exercise**
	10/28	Fall Break		
10	10/31	Speaker on health analytics		**Extra Credit Questions for speaker Due**
	11/2	OUTSIDE SPEAKER		**Extra Credit Questions for speaker Due**
	11/4	Legal and Ethical Issues in Health IT	Instructor Slides- Legal and Ethical Issues Read HIM Slides-Chap 2 Legal Issues in HIM Read HIM Slides-Chap 28 Ethical Issues in HIM Read HIM Slides-Chap 11 Data Privacy, Confidentiality and Security	
11	11/7	Legal and Ethical Issues in Health IT	Instructor Slides- Legal and Ethical Issues Read HIM Slides-Chap 2 Legal Issues in HIM Read HIM Slides-Chap 28 Ethical Issues in HIM Read HIM Slides-Chap 11 Data	

				Privacy, Confidentiality and Security	
	11/9	Group Prototype presentations			**PRESENT GROUP PROTOTYPE FOR CLASS REVIEW (EXTRA CREDIT)**
	11/11	Advanced form interactions and MS Access functions	M-Chap 18 Writing Smarter Code		**Ex#8 Short Answer**
12	11/14	Clinical Decision Support and Advanced Systems	Instructor Slides- Clinical Decision Support and Advanced Systems		
	11/16	Clinical Decision Support and Advanced Systems	Instructor Slides- Clinical Decision Support and Advanced Systems		
	11/18	Clinical Decision Support and Advanced Systems	Instructor Slides- Clinical Decision Support and Advanced Systems		**Ex#9 Short Answer**
13	11/21	Reimbursement Processes			
	11/23	Reimbursement Processes			
	11/25	**THANKSGIVING**			
14	11/28	Briefing for presentations and mock presentation	Group Presentation Instructions		
	11/30	**Evidence-Based Medicine Patient Monitoring Systems and Internet of Things**			Presentations
	12/2	**Social media and healthcare Bioinformatics**			Presentations **Ex#10 Short Answer Due**
15	12/5	**Healthcare analytics Telemedicine**			Presentations
	12/7	**Semester Project Presentations**			**SUBMIT FINAL SEMESTER PROJECT**
	12/9	Final Exam Review			
16	12/13	**FINAL EXAM (COMPREHENSIVE SHORT ESSAYS) Tuesday, December 13, 10:00-11:55am**			

**This schedule is subject to change without notice. Check the online syllabus often for latest updates.