MMI-DL 403 Syllabus

Vikram Sheshadri, PhD

Introduction to Medical Informatics

Spring 2010

Contact Information:

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Course Description:

This course is a survey of fundamental concepts and activities on information technology as applied to health care. Topics include computer-based medical records; knowledge-base systems, decision theory and decision support; human-computer interfaces; systems integration; the digital library; and educational applications. Department-specific applications will also be discussed.

Text: The primary text for the course will be Biomedical Informatics by Shortliffe and Cimino 3rd Edition. Readings will be assigned in advance of each class and can be found on the course Web site. Additionally, online articles will be used to supplement the text.

Biomedical Informatics: Computer Applications in Health Care and Biomedicine Series: Health Informatics
Shortliffe, Edward H. (Ed.)
3rd ed., 2006 Springer Science+Business Media, LLC, XXVI, 1037 p., 159 illus., 4 in color, Hardcover
ISBN: 978-0-387-28986-1

Software: NONE

Prerequisites: There are no formal prerequisites to the course. It will be assumed that the student has some familiarity with databases and how information is organized, stored and retrieved on a computer. Basic statistics will be used to describe information retrieval techniques, but essential topics will be reviewed in class.

Learning Goals:

At the completion of the Introduction to Medical Informatics courses, students should be able to:

- Explain the academic discipline of medical informatics and the role of medical informatics in clinical healthcare applications
- Recognize how medical data including clinical, administrative, and financial data, is used in healthcare applications
- Comprehend the nature of medical knowledge and decision-making and the role of decision support systems, knowledge-based systems and artificial intelligence methods
- Identify how current and emerging information delivery methods including mobile networks, Web-based databases and decision support systems, and enterprise information systems can be used to enhance patient outcomes
- Demonstrate sensitivity to issues of privacy, ethics, and compliance issues in the collection, distribution, and use of medical information, especially patient records
- Evaluate current informatics software and systems used for clinical and professional support
- Recognize the integration between research, clinical data, and theory in improving patient outcomes

Evaluation: Students will be evaluated using the following criteria:

Team project paper and presentation	20%
Participation in the following - Class discussions - Group project - Group study sessions - Peer evaluations - Discussion Board	30%
Midterm Exam	25%
Final examination	25%
Total	100%

Discussion Board Etiquette: The purpose of Discussion Boards is to allow students to freely exchange ideas and participation is highly encouraged. It is important that we always remain respectful of one another's viewpoints and positions and, when necessary, agree to disagree, respectfully. While active and frequent participation is encouraged, cluttering a Discussion Board with inappropriate, irrelevant, or insignificant material will not earn additional points and may result in receiving less than full credit. Although frequency is not unimportant, content of the message is paramount. Please remember to cite all sources – when relevant – in order to avoid plagiarism.

Proctored Assessment: There is a proctored assessment requirement in this course. For additional information, please go to the *Assignments* section in Blackboard and scroll to the Proctored Exam Approval Application item.

Grading Scale: The following grading scale will be used for the course

A   93-100
A-   90-92
B+   88-89
B   83-87
B-   80-82
C+   78-79

C   73-77
C-   70-72
F   Below 70

Attendance: Even though we will not be meeting face-to-face in a physical classroom, attendance at the 8 synchronous sessions and participation on Discussion Boards are required and paramount to your success in this class. 30% of the grading for this course is based on participation so attendance for all of the synchronous sessions is required.

Late Work: Students are expected to submit all assignments by the indicated due date. Late submissions will not be accepted unless previously approved by the instructor. Requests for approval for a late submission must be sent to the instructor (or TA) two days prior to the due date of the assignment. Students are required to complete all assignments to complete the course.

Learning Groups: Groups will be created by the instructor in the second week of the course for group study. A different student from each group will be identified as the group facilitator for the two group sessions.

A group project that applies the concepts presented in the course to a challenging situation in healthcare will be required. Groups will prepare a project proposal, final paper, and in-class presentation of their project.

Academic Integrity at Northwestern: Students are required to comply with University regulations regarding academic integrity. If you are in doubt about what constitutes academic dishonesty, speak with your instructor or graduate coordinator before the assignment is due and/or examine the University web site. Academic dishonesty includes, but is not limited to, cheating on an exam, obtaining an unfair advantage, and plagiarism (e.g., taking material from readings without citation or copying another student's paper). Failure to maintain academic integrity will result in a grade sanction, possibly as severe as failing and being required to retake the course, and could lead to a suspension or expulsion from the program. Further penalties may apply. For more information, visit:
http://www.scs.northwestern.edu/student/issues/academic_integrity.cfm

Plagiarism is one form of academic dishonesty. Students can familiarize themselves with the definition and examples of plagiarism, by visiting the site http://www.northwestern.edu/uacc/plagiar.html. Myriad other sources can be found online, as well.

Some assignments in this course may be required to be submitted through SafeAssign, a plagiarism detection and education tool. You can find an explanation of the tool here. In brief, SafeAssign compares the submitted assignment to millions of documents in very large databases. It then generates a report showing the extent to which text within a paper is very similar or identical to pre-existing sources. The user can then see how or whether the flagged text is cited appropriately, if at all. SafeAssign also returns a percentage score, indicating the percentage of the submitted paper that is similar or identical to pre-existing sources. High scores are not necessarily bad, nor do they necessarily indicate plagiarism, since the score doesn't take into account how or whether material is cited. (If a paper consisted of just one long quote that was cited appropriately, the score would be 100%. This wouldn't be plagiarism, due to the appropriate citation. However, just submitting one long quote would probably be a pretty bad paper.) Low scores are not necessarily good, nor do they necessarily indicate a lack of plagiarism. (If a 50-page paper had all original material, except for one short quote that was not cited, the score might be around 1%. But, not citing a quotation would still be plagiarism.)

SafeAssign includes an option in which the student can submit a paper and see the resultant report before submitting it to the instructor as a final copy. This ideally will help students better understand and avoid plagiarism.

Other Processes and Policies: Please refer to your SCS student handbook at http://www.scs.northwestern.edu/grad/information/handbook.cfm for additional course and program processes and policies.

Course Schedule

Important Note: Changes may occur to the syllabus at the instructor's discretion. When changes are made, students will be notified via an announcement in Blackboard.

Session 1

Learning Objectives:
After this session, the student will be able to:

- Explain the academic discipline of medical informatics and the role of medical informatics in clinical healthcare applications
- Recognize how medical data including clinical, administrative, and financial data, is used in healthcare applications
- Comprehend the nature of medical knowledge and decision-making and the role of decision support systems, knowledge-based systems and artificial intelligence methods
- Identify how current and emerging information delivery methods including mobile networks, Web-based databases and decision support systems, and enterprise information systems can be used to enhance patient outcomes
- Demonstrate sensitivity to issues of privacy, ethics, and compliance issues in the collection, distribution, and use of medical information, especially patient records
- Evaluate current informatics software and systems used for clinical and professional support
- Recognize the integration between research, clinical data, and theory in improving patient outcomes

Course Content:

Reading – For this session please read: Text chapters 1, 2, 19

Discussion Board
　None

Assignment
　Standardized coding and classification systems is due by Thursday, April 8th at 9:30pm (central time). For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Sync Session
　Thursday April 1st, 7:00 PM-9:00PM (central time)

Session 2

Learning Objectives:
After this session, the student will be able to:

- Differentiate between data, information, and knowledge
- Define unique characteristics of medical data, and its unique methods of storage and capture
- Recognize how the systems development life cycle comprises a disciplined approach to the development of information systems
- Investigate and illustrate five different approaches to the systems development life cycle (SDLC)
- Explain the role of data and information in the therapeutic cycle

Course Content:

Reading – For this session please read: Text chapters 2, 6

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
Standardized coding and classification systems is due by Thursday, April 8th at 9:30pm (central time). For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Sync Session
Thursday April 8st, 7:00 PM-9:00PM (central time)

Session 3

Learning Objectives:
After this session, the student will be able to:

- Define common terminology and concepts related to medical database design
- Evaluate the therapeutic cycle in the context of the challenges of clinical data entry
- Define and compare EMR (electronic medical record) and EHR (electronic health record)

Course Content:

Reading – For this session please read: Text chapters 5, 12.

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment

None

Sync Session
Thursday April 15st, 7:00 PM-9:00PM (central time)

Session 4

Learning Objectives:
After this session, the student will be able to:

- Identify medical-professional standards that impact the creation of EHRs
- Recognize and predict ethics and privacy issues that typically concern patients

Course Content:

Reading – For this session please read: Text chapters 7, 10
Articles: Informed Consent to the Secondary Use of EHRs, Privacy-Preserving Data Releases for Health Report Generation

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
There are two assignments due by Thursday April 22 at 9:30 PM:
1. In your assigned groups, answer questions about the readings
2. Submit a Peer Evaluation form for your group members

For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Sync Session
There is no sync session this week

Session 5

Learning Objectives:
After this session, the student will be able to:

- Recognize how probability concepts are applied to medical decision-making
- Indicate how computers can play an important role in clinical decision-making

Course Content:

Reading – For this session please read: Text chapters 3, 20

Discussion Board

Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
Group Project proposals are due by Thursday, April 29th at 9:30pm (central time). For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Mid Term Exam is due by Thursday, May 6th at 5:00pm (central time).The midterm will be available at the end of the sync session on Thursday April 22. For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Sync Session
Thursday April 29st, 7:00 PM-9:00PM (central time)

Session 6

Learning Objectives:
After this session, the student will be able to:

- Compare conceptual models of medical systems and information storage and retrieval
- Recognize and classify medical enterprise information systems
- Differentiate components in a hospital information system

Course Content:

Reading – For this session please read: Text chapters 13, 16 and view the video on the blackboard site prior to the synch session.

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
Mid Term Exam is due by Thursday, May 6th at 5:00pm (central time). For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Sync Session
Thursday May 6th, 7:00 PM-9:00PM (central time)

Session 7

Learning Objectives:
After this session, the student will be able to:

- Explain the formal study of medical information resources

- Apply evaluation criteria for medical information system purchase
- Discuss various approaches to evaluating an information resource
- Discuss various emerging medical information technologies

Course Content:

Reading – For this session please read: Text chapter 21
Articles: Markle Foundation Surveyll, What is a PHR?

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
There are two assignments due by Thursday May 13th at 9:30 PM:
1. Working in your group, choose an emerging technology to analyze and write a business case
2. Submit a Peer Evaluation form for your group members

For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Sync Session
There is no sync session this week

Session 8

Learning Objectives:
After this session, the student will be able to:

- Recognize issues surrounding the development and implementation of human-computer interfaces
- Identify problems with current healthcare interfaces
- Consider frameworks for redesigning interfaces to emphasize the end-user's experience

Course Content:

Reading – For this session please read: Text chapters 4, 14, 15

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
PHR is due by Thursday, May 27th at 9:30pm (central time). There is nothing that needs to be submitted for this assignment. For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

Sync Session
Thursday May 20th, 7:00 PM-9:00PM (central time)

Session 9

Learning Objectives:
After this session, the student will be able to:

- Discuss approaches to evaluating an information resource
- Recognize subjectivist vs. objectivist studies
- Discuss approaches to cost analysis

Course Content:

Reading – For this session please read: Text chapter 11

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
NONE

Sync Session
Thursday May 27th, 7:00 PM-9:00PM (central time)

Session 10

Learning Objectives:
After this session, the student will be able to:

- Provide a basic definition of the Human Genome Project
- Identify molecular markers and genotyping
- Recognize what obstacles the field of imaging informatics needs to overcome to improve clinical research

Course Content:

Reading – For this session please read: Text chapters 9, 24 and view the video available on the blackboard

Discussion Board
Each Session you are required to participate in all Discussion Board forums. Your participation in both posting and responding to other students' comments is graded. For this week's discussion topic(s), visit the Discussion Board in Blackboard.

Assignment
Group project paper is due by Thursday, June 3rd at 9:30pm (central time). For more information, click *Assignments* on the left navigation bar in Blackboard, and scroll to this assignment's item.

The final exam will be available from Friday, June 4th at 9:00 AM through Wednesday, June 9th at 5:00PM. The final will need to be completed at your proctor site in this window

Sync Session
    Thursday June 3rd, 7:00 PM-9:00PM (central time)