

## MMI-DL 498 Syllabus

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### Capstone Course Fall 2010

**Contact Information:** Pertaining office hours, please e-mail/call with questions or to schedule an appointment. I will be as flexible as my schedule allows supporting Northwestern University's Master of Medical Informatics (MMI) goal of developing learning communities.

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**Course Description:** This course provides an opportunity create a project for your portfolio to demonstrate your knowledge and skill in the Medical Informatics arena. From an academic perspective, the course provides an opportunity to demonstrate that you have achieved the following MMI course goals and objectives through a culminating team project and a learning portfolio grounded to courses taken in the MMI program. MMI program core courses, goals and objectives include:

- **MMI 401 American Healthcare System:**
  - Acquire a working knowledge of the key facts about our healthcare system
  - Understand the perspectives of each of the entities within the American healthcare system, and how they view their roles within the system
  - Develop a framework for understanding major healthcare issues
- **MMI 402 Introduction to Clinical Thinking:**
  - Understand the current clinical care environment in which problem solving occurs
  - Establish a clinical thinking perspective
  - Appreciate the complexity of applying an EMR context to clinical care
  - Know the how and why for narrative and structured content
  - Apply techniques to specific clinical case examples
  - Explore future EMR areas

- **MMI 403 Introduction to Medical Informatics:**
  - Understand the academic discipline of medical informatics and the role of medical informatics in clinical health care applications
  - Understand how medical data including clinical, administrative, and financial data, is used in healthcare applications
  - Understand the nature of medical knowledge and decision-making and the role of decision support systems and knowledge-based systems
  - Understand how current and emerging information delivery methods including Web-based databases and decision support systems enterprise information systems and Regional Health Information Organizations can be used to enhance patient outcomes
  - Be sensitive to issues of privacy, ethics, and compliance issues in the collection, distribution, and use of medical information, especially patient records
  - Be able to evaluate current informatics software and systems used for clinical and professional support
  - Understand the integration between research, clinical data, and theory in improving patient outcomes
- **MMI 404 Health Care Operations:**
  - Acquire a working knowledge of the core operations of hospital organizations
  - Develop an understanding of the role of information technology within hospital operations
  - Equip students with the critical thinking skills required to analyze and improve hospital operations
  - Evaluate the role of the management team and the Board of Directors
- **MMI 405 Healthcare Information Technology Integration, Interoperability and Standards:**
  - 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
- **MMI 406 Decision Support Systems and Healthcare:**
  - Describe current uses of medical decision making and decision support systems in health care.
  - Understand the benefits and limitations of medical decision making techniques.
  - Use various decision making and analytic models to solve both structured and unstructured problems.
  - Understand the basic features, benefits, and limitations of machine learning and intelligent decision support methods in the healthcare environment.
  - Understand the role of performance measurement in guiding DSS deployment.
  - Develop a model for a prototype DSS to address a healthcare problem.
- **MMI 407 Legal, Ethical and Social Issues in Medical Informatics:**
  - Identify Protected Health Information (PHI) and understand the range of permissible uses and disclosures allowed by HIPAA
  - Develop ability to analyze, criticize and construct rigorous policy-oriented arguments for the appropriate handling of healthcare data
  - Explain basic government regulations and legal principles applicable to healthcare data management, i.e. how to keep your CIO out of jail

- **MMI 407 Legal, Ethical and Social Issues in Medical Informatics:**
  - Summarize The Joint Commission's accreditation interest in medical informatics and data handling
  - Identify the key components of an effective compliance program, including a demonstration of regulatory informatics
  - Demonstrate critical thinking and thought leadership regarding future legal and ethical regulation of medical informatics in the U.S. social landscape
  - Develop a basic facility with legal terminology to be in position to know when, and how, to consult effectively with corporate legal counsel
- **MMI 408 Medical Technology Acquisition and Assessment:**
  - Acquire a working knowledge of the core operations of hospital organizations
  - Develop an understanding of the role of information technology within hospital operations
  - Equip students with the critical thinking skills required to analyze and improve hospital operations
  - Evaluate the role of the management team and the Board of Directors
- **MMI 409 Biostatistics and Medical Informatics:**
  - Understand conceptually the theoretical basis and underlying assumptions for the statistical topics covered.
  - Appropriately analyze data with SPSS statistical software and to draw meaningful inferences from data.
  - Recognize when and how to apply the diverse statistical methods discussed throughout the course in varying research situations.
- **MMI 481 Leaders:**
  - Understand the definition of organizational culture and how culture impacts an organization's effectiveness and ability to change
  - Understand why human change or don't change and how to apply these dynamics organizational change.
  - Gain insights into organization alignment as a strategy execution method and change management method
  - Identify your personal influence and style and how best to use and expand on this for influence in your organization
- **CIS 313 Networking and Telecommunications:**
  - Understand the OSI Model and the different components that comprises the OSI Model
  - Discuss data transmission and different types of transmission media
  - Describe various telecommunication circuit types
  - Describe various LAN hardware devices
  - Describe transmission efficiency and multiplexing
  - Understand the different components that comprises the Data Link layer
  - Describe TCP/IP addressing and functionality
  - Describe Medium Access Control protocols including CSMA/CD and Token passing
  - Understand LANs, CANs, MANs, & WANs
  - Discuss wireless LANs
  - Discuss how telecommunications can influence and infiltrate our daily lives and more
  - Understand how communications in all forms are currently in our lives now
- **CIS 317 Database Management Systems:**
  - Understand the fundamentals of database management and data organization
  - Design and implement database application
  - Managing the large bodies of data
  - Understand how the data are actually organized in the abstract data structures
  - Understand relational languages and how they are used to provide the interface for DBMS
- **CIS 435 Introduction to Data warehouse and Data Mining:**
  - Data mining algorithms, Data mining applications i.e. data warehousing.

**Text:** Required and suggested resources (text books and other MMI course resources) form the foundation for the culminating capstone project. Additional resources will be acquired through Northwestern's library through performing a literature review to complete the group project assignment. Northwestern University libraries may be found at:

Galter Health Science Library: <http://www.galter.northwestern.edu/>  
Northwestern University Library: <http://www.library.northwestern.edu/>

**Software:** Blackboard, Adobe Connect Pro and an HTML webpage building and hosting software product. Suggested options will be discussed during the presentation on "How to create your learning portfolio." Options range from free to high-end HTML editors. The purpose of this assignment is not to dictate which product you use but that you can submit an electronic portfolio (via a URL address that contains your portfolio) for review. Once the portfolio is created I hope that you maintain a professional portfolio outside of the MMI 498 Capstone Course.

**Prerequisites:** This course is the culminating experience of the MMI program. Students must demonstrate satisfactory completion of all MMI courses prior to registering for this course.

**Learning Goals:** At the completion of the culminating capstone project course, students should be able to:

- Demonstrate an application of knowledge acquired from the MMI program
- Work collegially on a team project
- Critically appraise individual and group strengths and areas for improvement
- Teach teammates from strengths and accept feedback from peers and faculty to advance individual/group knowledge and the quality of the team project

**Evaluation:** The final grade for the course is based on the following activities:

- Class participation (5%) – this includes class attendance, participation in group discussions and active contribution to the team project.
- Peer and faculty instruction/evaluation (5%) – students will teach team members and provide feedback on each group/individual's performance on their culminating capstone project.
- Learning Portfolio and Capstone Project Presentations (10%)
- Learning Portfolio and Reflection Papers (40%)
- Small Group Capstone project (40%) - Group projects will be evaluated on the content of the product, depth of analysis of the issues, and thoughtfulness of the solutions and or recommendations.

**Discussion Board Etiquette:** The purpose of Discussion Boards is to allow students to freely exchange ideas and participation is highly encouraged but is not required in this course.

**Proctored Assessment:** There is no proctored assessment requirement in this course.

**Grading Scale:** See the grading rubrics under "Assignments".

**Attendance:** This course is mostly asynchronous, meaning that we will not meet at a particular time each week. Even though we will not be meeting face-to-face in a physical classroom, attendance and participation during the synchronous session(s) are required and necessary to your success in this class.

**Late Work:** With at least 1 week advance written notice, work will be accepted up to one week after the due date. Approved late work will incur a 10% of the project grade penalty. Late work without prior written approval will lose 10% of the grade each day. Late group projects effects every member of the group. Late work will not be accepted after June 9, 2010 due to the instructor's deadline to submit final grades.

**Learning Groups:** Students will complete a culminating capstone team project and create a learning portfolio articulating an application of knowledge gained through the program via artifacts and reflection papers. Flexibility will be given to the class to choose/form small working groups and related to the project topic/scope, but the instructor has final approval of the number of participants per small group and direction of the small group project. One grade will be assigned based on the scoring rubric to the work produced by a small group. The portfolio assignment will result in an individual grade. Both projects will be presented to the group in weeks 9 and 10. For each project, students will be assessed individually by their peers and a faculty member. Final documents will be uploaded for review onto Blackboard.

**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](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

During session one, we will introduce ourselves, discuss expectations for the course and I will answer questions pertaining the video lecture capture, "How to conduct a literature review." An outline is provided below for the session.

1. Introductions
2. Discussion of expectations (individual and course goals)
  - Review and discuss course schedule
  - Review Project Scenario option
  - Review scoring rubric, portfolio and reflection paper directions
  - Group consensus on course schedule and expectations
  - Group consensus on team assignments
0. Answer questions related to:
  - How to perform a literature review
  - Discussion on the importance of utilizing the literature in the formation of your project
4. Form teams and choose project scenarios

#### **Discussion Board**

- Submit a statement through the discussion board pertaining what you expect to achieve out of the capstone course and of me by Wednesday, September 22, 2010.

#### **Assignments**

Due Wednesday, September 22, 2010 at 5:00 p.m.:

- Come to week one having already watched the lecture capture video titled, "How to conduct a literature review."
- Be prepared to choose team members for the group project and a scenario option.
- Submit a statement through the discussion board pertaining what you expect to achieve out of the capstone course and of me by Wednesday, September 22, 2010.

Due Wednesday, September 29, 2010 at 5:00 p.m.:

- The Literature Review Annotated Bibliography is due by Wednesday, September 29, 2010, at 5:00 p.m. (central time).

#### **Sync Session**

Wednesday, September 22, 2010, 7:00 p.m. – 9:00 p.m. (Central Time)

## Session 2

During session two, we hold an interactive group status update on group projects and I will answer questions regarding the lecture capture titled, "How to Develop a Professional Electronic Portfolio." An outline is provided below for the session.

1. Status check-in and feedback:
  - Opportunity to discuss project specific questions pertaining the electronic portfolio assignment or the literature review process with the group and faculty member and acquire peer/faculty feedback
2. Question and answer session pertaining the assignment:
  - How to develop a professional electronic portfolio

### **Discussion Board**

Optional - not required.

### **Assignment**

- Status Report Update: Submit one written progress report update (e.g., the literature search history, annotated bibliography, and project summary and project division of labor). This assignment is due by Wednesday, September 29, 2010 at 5:00 p.m. (central time).
- Watch the lecture capture titled, "How to Develop a Professional Electronic Portfolio." This assignment is due by Wednesday, September 29, 2010 at 5:00 p.m. (central time).

### **Sync Session**

Wednesday, September 29, 7:00 p.m. – 9:00 p.m. (Central Time).

## Session 3

During session three, we hold an interactive group status update on group projects and I will answer questions. An outline is provided below for the session.

1. Status check-in and feedback:
  - Opportunity to discuss project specific questions with the group and faculty member and acquire peer/faculty feedback

### **Discussion Board**

Optional - not required.

### **Assignment**

Status Report Update: Submit a written progress report update (e.g., any revisions to the literature search history, annotated bibliography, and project summary and project division of labor). This assignment is due by Wednesday, October 13, 2010 at 5:00 p.m. (central time).

### **Sync Session**

Wednesday, October 6, 2010, 7:00 p.m. – 9:00 p.m. (Central Time)

## Session 4

During session four, we hold an interactive group status update on group projects. An outline is provided below for the session.

1. Status check-in and feedback:
  - Opportunity to discuss project specific questions with the group and faculty member and acquire peer/faculty feedback.

### **Discussion Board**

Optional - not required.

### **Assignment**

Status Report Update: Submit a written progress report update (e.g., any revisions to the literature search history, annotated bibliography, and project summary and project division of labor). This assignment is due by Wednesday, October 20, 2010 at 5:00 p.m. (Central Time).

### **Sync Session**

Wednesday, October 13, 2010, 7:00 p.m. – 9:00 p.m. (Central Time)

## Session 5

**Independent Study** - Submit a written a group progress report update

### **Discussion Board**

Optional - not required.

### **Assignment**

Status Report Update: Submit a written progress report update (e.g., any revisions to the literature search history, annotated bibliography, and project summary and project division of labor). This assignment is due by Wednesday, October 20, 2010 at 5:00 p.m. (central time).

### **Sync Session**

No sync session scheduled for week 5 (Wednesday, October 20, 2010).

## Session 6

During session six, we hold an interactive group status update on group projects. An outline is provided below for the session.

1. Status check-in and feedback:
  - Opportunity to discuss project specific questions with the group and faculty member and acquire peer/faculty feedback.

### **Discussion Board**

Optional - not required.

### **Assignment**

Status Report Update: Submit a written progress report update (e.g., any revisions to the literature search history, annotated bibliography, and project summary and project division of labor). This assignment is due by Wednesday, November 3, 2010 at 5:00 p.m. (central time).

## Sync Session

Wednesday, October 27, 2010, 7:00 p.m. – 9:00 p.m. (Central Time)

### **Session 7**

During session seven, we will hold an interactive group status update on group projects. An outline is provided below for the session.

1. Status check-in and feedback:
  - Opportunity to discuss project specific questions with the group and faculty member and acquire peer/faculty feedback.

## Discussion Board

Optional - not required.

## Assignment

Status Report Update: Submit a written progress report update (e.g., any revisions to the literature search history, annotated bibliography, and project summary and project division of labor). This assignment is due by Wednesday, November 10, 2010 at 5:00 p.m. (central time).

## Sync Session

Wednesday, November 3, 2010, 7:00 p.m. – 9:00 p.m. (Central Time)

### **Session 8**

**Independent Study** - Submit a written a group progress report update

## Discussion Board

Optional - not required.

## Assignment

- Submit a written a group progress report update
- Watch the lecture capture titled, "Effective Presentation Skills." This assignment is due by Wednesday, November 17, 2010 at 5:00 p.m. (central time).

## Sync Session

Wednesday, November 10, 2010, 7:00 p.m. – 9:00 p.m. (Central Time)

### **Session 9**

During session nine, students will present highlights of their portfolio to the class.

## Discussion Board

Optional - not required.

## Assignment

- Individual Learning Portfolio Presentations: Each student will present highlights of their portfolio to the class and submit their electronic portfolio via a hosted web URL address to the instructor and TA by Wednesday, November 17, 2010 at 5:00 p.m. (central time).

## Sync Session

Wednesday, November 17, 7:00 p.m. – 9:00 p.m. (Central Time)

**NO SYNCH SESSION ON Wednesday, November 24, 2010. Thanksgiving Holiday.**

## **Session 10**

During session ten, students will present highlights of their group project to the class.

### **Discussion Board**

Optional - not required.

### **Assignment**

Group Project Presentations: Each small group will make a formal presentation to the class and invited guests and submit a copy of their paper/final deliverable, to the instructor and TA, by the tenth session (Wednesday, December 1, 2010 at 5:00 p.m., central time).

### **Sync Session**

Wednesday, December 1, 2010, 7:00 p.m. – 9:00 p.m. (Central Time)