

An Educationalist



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He has been a full time professor, adjunct professor, or invited lecturer at Saint Joseph’s College of Maine, New England College, Northeastern University, Dartmouth College, University of Massachusetts, University of New Hampshire, Massachusetts Institute of Technology, and Daniel Webster College.

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A. Medical Informatics

Course Prerequisites

- Access to a computer with at least a Windows 2000 operating system.
- Access to the Internet.
- An email address
- Microsoft Word and Microsoft Access

Introduction

Medical informatics has to do with all aspects of understanding and promoting the effective organization, analysis, management, and use of information in health care. The field of medical informatics crosses many areas of health care specialties and disciplines with a common thread of emphasis on technology as an integral tool to help organize, analyze, manage, and use information. In addition, medical informatics has historically tended to be engaged in the research, development, and evaluation, and in studying and teaching the theoretical and methodological foundation of data applications in health care. Today’s medical informatics also counts among its profession many whose activities are focused on dimensions that include the administration and everyday collection and use of information in health care.

The healthcare industry has experienced dramatic changes over the past twenty-five years. Health care has grown from a minor financial player to one of the largest segments of our national economy. Today, healthcare is a \$1 trillion industry representing 14.5% of the United States Gross Domestic Product (GDP). By mid-1990 the industry had moved from a system mostly of indemnity programs where patients went to physicians and physicians billed the insurer - to an industry with a

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myriad of providers and payers and more delivery systems and payment options including managed care companies, provider networks, deductibles, co-pays, risk arrangements and capitation payments. The resulting system, controlled primarily by employers and insurers, has been focused for the past decade on cost controls, too often at the expense of focus or concern for patients and consumers.

The move into the 21st century has accompanied not only by a continued focus on management and control of healthcare costs, but also an emphasis on electronic and procedure standardization and improvement in patient quality of care. United States laws such as the Health Insurance Portability and Accountability Act of 1996 (HIPAA) are requiring all health providers to conform to generally accepted industry standards for electronic transactions, privacy, security and disclosure of protected health information.

Today computerized information systems are available for all types of health organizations. This includes community hospitals, academic medical centers, physician offices, home care, and nursing homes. Even the consumer/patient uses Internet technology to play a significant role in their own healthcare by empowering them to use technology tools for managing their own personal healthcare information. We now see integrated healthcare systems and continuity of care as the focus of wellness and patient care. Web-based applications are requiring healthcare providers, insurers, and consumers to extend their imagination and opportunity beyond patient care to include wellness and disease prevention. Information technology is most generally the enabler of this innovation as we continue to learn how health information is understood utilized.

All this innovation, while available, is not necessarily implemented or used to its fullest extent. For example, estimates are that 80% of hospital medication errors occur at order entry. Although computerized physician order entry (CPOE) systems that flag potential medication errors cut the number of serious prescribing errors in half, fewer than 5% of hospitals use them, as found by a study of The Leapfrog Group, a coalition of public and private organizations that provide health care benefits. An obvious question is, “if CPOE is shown to reduce medical errors, then why are not all organizations required to use them?” Reasons such as high cost, uninformed health organizations, other financial priorities, and politics all are offered as answers to this dichotomy.

What remains important is the need to understand the opportunity medical informatics, and its emphasis on technology as an integral tool to help organize, analyze, manage, and use information, can offer for disease and illness prevention, management of health costs, enhancement of quality of care, and the understanding and use of health data. Cost reduction and quality depends upon the ability of clinicians and management to make cost effective decisions in a timely fashion. This is difficult if quality and timely data and information are not available when needed. As a result health care organizations must use computers, databases, and management software to assist them in obtaining the necessary information for these decisions.

New regulations encourage health care organizations to promote the field of medical informatics. HIPAA requires administrative simplification such as electronic data storage to conform to standard codes. These standard requirements will make it easier for data integration for more informed studies and the improvement for continuum of health care from birth throughout life.

Other recent developments include standards by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) encouraging information technology for data driven monitoring systems and new standards fostering the use of technology in-patient care. And the College of American Pathologists (CAP) is focusing increasingly on quality issues related to computing, as reflected in their greater emphasis on informatics in the CAP survey questionnaires. And a recent series of devastating fines have been levied against institutions that failed to justify medical interventions or properly document the participation of house staff and fellows in care delivered.

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Institutions that addressed documentation issues through medical informatics have been better equipped to undergo audits. As a result of these regulation changes, health care organizations are directed, albeit some unwillingly, into the arena of information systems.

Many of the new technological developments, such as decision support CPOE, evidence based medicine, patient-monitoring systems, and data mining databases, utilize computers in the operation of the environments. Researchers, clinicians, and others require the extension of "automated support into areas" such as computerized patient records. The HIPAA requirement of the unique individual identifier will make continuity of care and medical search extend into areas which further improve quality of care and reduced costs.

Course Description

This course is designed to provide a conceptual understanding of medical informatics and the importance of technology systems in the operation of today's health organizations.

The course provides opportunity to obtain basic knowledge necessary to be proactive in health administration. It brings you very quickly into the basics of a computer system and the Internet. It challenges you to understand and visualize medical informatics in real-world situations. Interviews with end-users and information systems management provide end-user and information systems staff perspectives. The course focuses on the use of information systems in health organizations and its impact on administration, patient care, nursing, research, and strategic management. It addresses the end-user role of prioritization, selection, design, and implementation of information systems, and examines how health information is understood and utilized. It briefly looks at regulatory requirements and its impact on technology growth and enhancements. The Internet supports all areas of this course.

Course Objectives

At the conclusion of this course you should:

- Define medical informatics and its role and in implementation and growth of information technology
- Know the basic components of computerized information systems including the personal computer, data storage devices, software, networks, databases, Internet and web-based applications.
- Have acquired a basic knowledge of many of the different computerized systems used today in health care organizations.
- Understand the application development life cycle in terms of analysis, design, selection, implementation, support, maintenance, testing and evaluation.
- Be able to use the application development life cycle to develop a small database information system that demonstrates knowledge of the steps required for application development and evaluation.
- Understand the benefits, costs and issue of medical informatics in the health field of today and tomorrow. To understand the opportunities of integrated systems and how wellness and sickness are addressed in today's healthcare environment.
- Know where to obtain reliable healthcare knowledge resources.
- Understand the myriad of perspectives of those responsible for using and managing information systems (e.g. clinician, administrator, consumer, patient, information technologist).

B. Health Insurance Portability and Accountability Act (HIPAA)

COURSE DESCRIPTION

The Health Insurance Portability and Accountability Act (HIPAA) provides for the protection of personal health information by covered entities (health plans, clearinghouses, and certain healthcare providers). In February 2003, the final security rule was published by the US Department of Health and Human Services to ensure the confidentiality, integrity, and availability (CIA) of electronic protected health information that the covered entity creates, receives, maintains, or transmits.

The final rule requires health organizations take action to understand their security risks and vulnerabilities and to adopt safeguards by April 21, 2005. While the text of the final rule is only 5 pages long, it is open to considerable interpretation and action of each covered entity.

The HIPAA Security Rule includes 25 security standards and 51 security implementation specifications. While the specifications cite “required” and “addressable” safeguards, in reality all specifications are required to be considered and documented.

This course explores the entire HIPAA security regulation, including its preamble. Through class presentations, case studies, Internet research, and discussion, we’ll examine approaches and options for covered entities to comply with the rule. We’ll also consider the flexibility of the rule, its benefits to healthcare providers and payers, and various ways to achieve, monitor, and maintain compliance.

Among the questions that will be woven into our discussions and presentations will be:

- How do the HIPAA Privacy Rule and Security Rule relate?
- How do security risk analysis and risk management differ?
- Where do I start with HIPAA Security?
- Is HIPAA an opportunity for continuum of care?
- How does HIPAA Security impact the electronic medical record (EMR), computerized physician order entry (CPOE), e-prescribing, and other emerging technologies?
- Is HIPAA Security the catalyst for “best practice” acceptance of emerging technologies?

COURSE OBJECTIVES

- Discuss the background and rationale of the HIPAA statute;
- Describe the impact of HIPAA legislation on healthcare consumers, providers, and payers;
- Discuss the HIPAA security rule and its principles for confidentiality, integrity, and availability of electronic protected health information (e-PHI)
- Define key terms for HIPAA administrative, technical and physical safeguard standards and specifications;
- Understand the difference between addressable and required specifications;
- Explain the importance of risk analysis, risk management, and due diligence in implementing and maintaining all HIPAA training and documentation requirements;

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- Understand various choices and options for security technologies;
- Understand how the HIPAA privacy and security rules interact with each other;
- Locate resources necessary to maintain currency on HIPAA Security and assist in implementing the HIPAA Security Rule.

C. Integrating People and Technology into the Office Environment

COURSE DESCRIPTION

This course introduces students to the personal computer (PC) and communication applications of today's computerized office. A variety of PC and communication software will be introduced including: computer ethics; web concepts; advanced e-mail; web development; presentation software; advanced word processing; compression software; spreadsheets and graphics. Upon completion of this course the student should be accomplished to get self-assistance with on-line Help and Internet support.

A prerequisite for this course:

- *Beginning level keyboard and Windows skills.*
- *An email address*

OBJECTIVES

Upon completion of this course, you should be able to

- Learn to get application help through on-line Help and Internet support
- Understand current development and concerns in modern computer technology
- Identify and apply the legal, ethical, and privacy issues in the use of computers and information in your own life and to understand its impact on Society
- Differentiate between computer systems and information systems
- Use computer technology in presentations
- Use proper e-mail etiquette and functionality
- Use the Internet as a means of global communication, knowledge, and research.
- Use advanced word processing techniques
- Develop and use spreadsheets and graphs
- Customize reports in a sample database using Access Wizard.
- Design and implement a web page and its links.
- Relate communication software to its use in the business environment
- Use compression software to transfer large and multiple files

D. Seamless Integration of Blackboard e-Learning into Medical Informatics

The Blackboard Learning System™ seamlessly integrates into a Medical Informatics classroom course. This experience demonstrates how online software transforms the Internet into a powerful setting for both the learning and professional environment. Blackboard was an essential part of each week's class.

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As each feature of Blackboard was introduced to the students, students were asked to brainstorm how the feature might also be used in the healthcare environment. For example, when the **Discussion Board** was introduced, students were asked to envision how this online technique might be used between a clinician and patient to enhance care, reduce the cost of an office visit, and save time. And when the Blackboard online **Survey** was used for course feedback, students were asked to brainstorm how patients being surveyed online for office visit satisfaction might use a similar online survey.

Blackboard, in this course, was taken beyond a classroom tool as students were asked to relate their own Blackboard experience to their professional healthcare settings. [Note: students taking this graduate course were all practicing healthcare professionals.]

Blackboard was an integral part of the class. For example, a course needs a Syllabus, and hence their Syllabus was available through Blackboard; students were familiar in filling out surveys, hence they did this through Blackboard; students used the Internet for research, hence Blackboard’s **Discussion Board** and **Group Pages** offered them an opportunity for sharing team and individual research. These are just some examples of how Blackboard simply “flowed” with their course experience.

Below is a summary of the features that were used in this Medical Informatics course. The Examples of Healthcare Setting Applications are not meant to be all-inclusive, by merely examples of some brainstorming comments offered by the various healthcare professionals in class.

Blackboard Feature	Use in Medical Informatics Class	Examples of Healthcare Setting Application
Syllabus	The course Syllabus was posted and used as needed by students as well as referenced online in class.	Posting of office hours, directions, etc
Discussion Board	Two major uses: <ol style="list-style-type: none"> 1. Each week a student was assigned to coordinate a current healthcare IT topic of his or her choice. Each student created a Forum of their choice, and the remaining students were responsible for researching the topic, posting on this forum a one to two page summary. The Coordinator then used these responses to present a Power Point presentation in class of the “team” research. 2. One person was assigned each week to keep Action items of the class that needed follow-up for the 	<ul style="list-style-type: none"> • Clinicians and patients focus on a topic and share their research and individual conclusions. • A Frequently Asked Questions (FAQ) forum can be used by patients to review responses, as well as for patients to share their own experiences.

	<p>next class. These Action Items were posted under a Discussion Board Forum.</p> <p>This was a use of Blackboard with extremely positive comments from the students.</p> <p>Note: A portion of the student grade is class participation. Discussion Board is part of that grade. It is very easy for the instructor to quickly review the topic for the week, and see if all students respond. Since the students could see each other's response, peer pressure assists to make sure all students have submitted their research.</p>	
Announcement	<p>Each week course announcements were posted. This included: special IT articles noted in the news; reminders of the next week's speakers and articles to read; instructor follow-up action items.</p>	<p>Special offerings of health classes, such as for diabetes, Alzheimer's, etc.</p>
Class Documents	<p>All files used by the instructor are posted under the Class Documents area. No hardcopy was used in handed in class. All class material was available for retrieval and viewing online.</p>	<ul style="list-style-type: none"> • Posting of interesting articles, etc • Document Management such as department and organization policies, etc.
Grades	<p>Each week the grades of presenters were posted.</p>	<p>Employee Reviews</p>
Group Pages	<p>An area was created called. "Medical Informatics Class Presentation Sharing." The students themselves posted all student class presentations here. This allowed all student developed material to be shared amongst themselves.</p> <p>This Medical Informatics Class Presentations area was subdivided into three areas: 1) CIO Interviews, 2) Article Assignment Presentation, and 3) Current IT Topic Presentation.</p>	<p>Sharing of special articles. Can be set up by category, such as diabetes, Alzheimer's, etc.</p>

	This made it easy for both student and instructor to retrieve and review specific presentations.	
Roster	<p>Students were all required to maintain an academic and professional profile, including a picture of them. A few students did not want to post a picture of them, so they were allowed them to post whatever picture they wanted. [The intent of this exercise was for the students to feel comfortable in posting graphics and pictures. Students were asked to envision a patient posting or physician posting a picture of a skin lesion, and this picture being reviewed by a dermatologist. Again, an example of how this online exercise might be used in the real-world of healthcare.]</p> <p>For those students who did not have a camera-ready picture, I came to class early the 2nd week, and took the digital picture of the individual, and they then downloaded it and immediately posted it to Blackboard</p>	In confidence, upload pictures, such as rashes, cuts, etc.
Staff Information	The Instructor Curriculum Vitae and picture were posted here	Physician CVs, etc.
Web Resources	The Web Resources area was used by the instructor to post links to sites designated important by the instructor and students.	Internet Reference sites.
Tests and Survey	<p>These features were used to demonstrate to the student online test and survey capabilities. At this time, the students were not graded on using these features, other than their participation.</p> <p>Test: The students were required to use the Test feature. However, rather than call it a test, I called it “Course Feedback”, and set it up in Essay format. Students</p>	Employee and patient surveys for a variety of things, such as patient wants, level of satisfaction, etc.

	<p>responded to five questions to assist the instructor in reviewing the course, including student use and perception of Blackboard.</p> <p>I would continue to expand the use of these features as the opportunity presents.</p>	
<p>Collaboration – Virtual Office</p>	<p>We discussed this feature in class. The students had a negative experience in a prior class. I shared with them my own experiences – both positive and negative – and if time allowed we were to simulate its use with one person being assigned to be the collaboration leader, with the other students to contribute.</p> <p>We were to use this as a brainstorming tool, with the collaborator leader to keep things on track. We were then, as a class, to use the Collaboration tool to evaluate its use.</p> <p>Our class schedule did not allow this use. I believe healthcare providers will shortly be using this collaboration feature – and the medical informatics students should see its potential.</p>	<p>Instant Message communication between patient and clinicians</p>
<p>Course Statistics</p>	<p>Part of the course grade was student class participation, including Blackboard use. The statistics available through Blackboard allows the instructor to see the number of times each student goes into a feature. For example, how many times they referred to Staff Information, how many times Web Reference, etc. The instructor also used this feature to identify students who were not using features of Blackboard, and to guide them in their use.</p>	<p>Monitor use of the Internet site, such as which areas are use, which ones are not.</p>

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E. Education

- M.S. - Industrial Engineering, University of Rhode Island, Kingston, Rhode Island
- B.S. - Industrial Engineering, University of Massachusetts; Amherst, Massachusetts
- Author of Information System Textbooks and Articles
- National Speaker on Information Technology in the Healthcare Setting
- Twenty (20) + Years as a Senior Hospital Administrator with Responsibilities for Information Systems, Materials Management, Patient Registration, Pharmacy, and Cancer Registry.