

HINF 1100
Introduction to Health Informatics
FALL 2008/09

Course Outline

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1. Course Description:

This course is an introductory course with an intention to provide the history, theory, applications and organizational perspectives of health informatics. HINF 1100 is designed with the purpose of imparting the students an overview of the various options for the adoption of Information Technology in the field of Health Care. The main focus of this course is to enable students to understand the fundamental nature of information and communication systems use in Health Care delivery, with respect to acquisition, storage and use of health information. An introduction to various health informatics topics such as Health Information Systems, Clinical Decisions Support Systems, Electronic Medical Record, Standards, Evidence-based Medicine, Health Information Retrieval, Public and Consumer Health Informatics will be provided through this course.

The teaching in this course will involve lectures by the instructor, guest lectures, class discussions, site tours and directed readings. Lectures will provide the knowledge of the fundamental concepts in the field of health informatics. Invited presentations by professionals will provide insights into the practical aspects of health informatics. Site tours to healthcare institutions/departments are to demonstrate health information system in action. The purpose of class discussion is to engage students in critical thinking and investigation of the subject. Directed reading is to promote independent learning and hence preparing students for further studies in this discipline.

2. Course Goals:

- To provide an overview of Health Informatics as a discipline
- To introduce the formal theories, methods and tools at the foundation of the field of Health Informatics
- To enable students to understand and describe the ways in which emerging health informatics technologies and processes can transform the health care.
- To enable students identify the issues and challenges in the design, development and application of emerging health are technologies and possible solutions to such problems.
- To prepare the students for advance study in the field of Health Informatics.

3. Class Expectations:

By the end of this course we expect that you

- Would be able to provide a working definition of Health Informatics.
- Would be able to distinguish between Data, Information and Knowledge specifically in the domain of Health Care.
- Would be able to aptly identify, analyze and apply principles of informatics in Health Care Systems.
- Would be able to identify various types of information systems used in health care institutions.
- Would be able to outline the purpose and the essential components of Electronic Medical Record and issues related to its implementation.
- Would be able to identify the issues related to designing and evaluating the health information systems.

4. Suggested Reading:

Most of the material taught in the class will be based on the instructor's notes. The following text book will be used to assign course readings:

1- Enrico Coiera, "Guide to Health Informatics", Second edition. Published by Arnold, 2003.

Other good reference books are:

2- Toni Hebda, Patricia Czar, Cynthia Mascara, "Handbook of Informatics for Nurses & Health Care Professionals" Third edition. Published by Pearson Prentice Hall.

3 – Frank Sullivan & Jeremy Wyatt, "ABC of Health Informatics", Blackwell Publishing, 2006.

5. Office Hours:

I will be available from 10.30am till 12pm on Mondays in my office (room no. 214, Faculty of Computer Science). You can book an appointment via email to meet me outside the office hours. **I can always be contacted via email and I prefer email over voice mail.**

6. Grading Scheme:

The following evaluation elements will constitute the final grade for this class:

1. Final Exam: 40% (3 hours)
2. Mid-Term Exam: 22% (2 hours)
3. Assignments: 18%
4. Quiz: 20%

Take Home Assignments: Students will be given 3-4 take home assignments, and they are expected to be completed by each student individually.

Mid-Term and Final Exams: Students will be required to write a mid-term and a final exam. The final exam will not cover the topics already examined in the mid-term exam. The exams will be for two hours and will consist of two main components. The first component will include the multiple-choice questions, which will assess the student's

knowledge and understanding of the basic Health Informatics concepts (foundation knowledge). The second part will include descriptive questions concerning the concepts covered in the class. Both the mid-term and Final exams will be **closed-book**.

Exam Related Considerations: Students with permanent or temporary disabilities who would like to discuss exam accommodations are asked to contact me as soon as possible. You can meet me after class or make an appointment to meet with me privately. Students with disabilities are encouraged to register as quickly as possible at the Student Accessibility Services if they want to receive academic accommodations. To do so please phone 494-2836, e-mail: access@dal.ca, drop in at the Killam, Room G28 or visit the website at www.studentaccessibility.dal.ca.

Class Participation: Students are encouraged to actively participate in in-class discussions. Marks will be awarded for the student's level and quality of contributions to in-class discussions.

7. Grading Policy:

Grading will be in accordance with the grade definition provided at the Faculty of computer science web-site under the Under-Graduate Course Details, available at <http://www.cs.dal.ca/undergraduate/gradeconversion.shtml>

8. Late Assignments:

Late submissions are subject to a penalty as follows: (a) Deduction of 10 marks for late submission within 24 hrs of submission date; (b) Deduction of 25 marks for late submission > 24 hrs and < 48 hrs of actual submission date; (c) Deduction of 40 marks for late submission > 48 hrs and < 72 hrs of actual submission date. No submissions after 72 hrs of the submission date will be accepted.

9. Plagiarism:

Students should be fully aware of all applicable University and Faculty policies regarding plagiarism, in particular the **Dalhousie plagiarism policy**. Students are advised to read, understand and comply with Dalhousie University's regulations on Intellectual Honesty as described in the Undergraduate Graduate Calendar at

<http://www.registrar.dal.ca/calendar/ug/UREG.htm#12>

and at <http://plagiarism.dal.ca/policies/index.html>.

It is the policy of the faculty of Computer Science to refer all suspected plagiarism cases to Senate Discipline Committee.

According to Dalhousie University's plagiarism policy, plagiarism can be defined as the "presentation of the work of another in such a way as to give one's reader reason it to be one's own". As a result students are advised to properly reference, research papers, web-sites and other sources of information in project reports and assignments. This also includes the URLs and the date of access for the web-sites. Any direct quotations (verbatim) from web sources or research papers should be enclosed in quotation marks.

Proposed Class Schedule:

Below is the proposed class schedule. This class schedule is not final and may change at the discretion of the instructor.

Week 1 –Introduction to Health Informatics

- Course plan and requirements
- Discuss student's and instructor's goals and objectives for the course
- Discuss the assignments
- What is Health Informatics?
- Why do we need Health Informatics?

Readings: Introduction to Health Informatics – The systems science of healthcare, Coiera

Week 2 - Models & Data, Information and Knowledge

- Concept of Model with respect to Health Informatics
- Purpose of Modeling
- Impact of design assumptions on the usefulness of these models.
- Data, Information and Knowledge and their relationship.
- How can we describe the Knowledge in terms of models?
- Abstraction and Template based construction of models and their relationship to knowledge acquisition and application.
- Requirement for interpretation of data – Database, Knowledge base and Inference procedure.
- Automation of the knowledge and data components of a decision problem.

Readings:

- 1- Chapter 1 “Model”, Guide to Health Informatics, Coiera.
- 2- Chapter 2 “Information”, Guide to Health Informatics, Coiera.

Week 2 & 3 – Information Systems

- System and its components.
- Input and output of a system and the feedback mechanisms.
- Environment, behavior and purpose of a system.
- Components of Information System – Data and Models.
- Various types of Health Care Information Systems.
- Purpose of different types of Health Care Information System.
- Basic components of Health Care Information Systems.
- Information management cycle.
- Formal and informal information systems and their use.

Readings:

- 1- Chapter 3 “Information Systems”, Guide to Health Informatics, Coiera.
- 2- Chapter 9 “Information Management Systems”, Guide to Health Informatics, Coiera.
- 3- Chapter 5 “Health Care Information System”, Handbook of Informatics for Nurses and Health Care Professionals, Hebda, Czar and Mascara.

Week 4 – Electronic Medical Record.

- Electronic Medical Record (EMR) vs. Paper based record - Advantages.
- Physical and informational aspects of EMR.
- Active uses of EMR.

Reading:

- 1 Chapter 10 “The Electronic Medical Record”, Guide to Health Informatics, Coiera.
- 2 Chapter 12 “The Electronic Health Record”, Handbook of Informatics for Nurses and Health Care Professionals, Hebda, Czar and Mascara
- 3 Chapter 5 “Health Care Information System”, Handbook of Informatics for Nurses and Health Care Professionals, Hebda, Czar and Mascara.

Week 5 – Protocol based systems

- Clinical pathways
- Clinical practice guidelines
- Care maps
- Computerization of clinical pathways, clinical practice guidelines and care maps.

Reading: Chapter 12 “Protocols and evidence based healthcare”, Guide to Health Informatics, Coiera

Chapter 13 “Computer-based protocol systems in healthcare”, Guide to Health Informatics, Coiera

Week 6 & 7(b) – Coding and Classification

- Healthcare terminology systems
- Data sharing standards.

Readings:

- 1- Chapter 16 “Terms, codes and classification”, Guide to Health Informatics, Coiera
- 2- Chapter 17 “Healthcare terminologies and classification systems”, Guide to Health Informatics, Coiera

Week 7(a) – MID-TERM OCTOBER 20, 2008 (All material covered till the end of Week 5)

Week 8 – Decision support systems

- Clinical support systems
- Knowledge representation schemes
- Reasoning systems
- Intelligent systems

Readings:

- 1 Chapter 25 “Clinical decision support systems”, Guide to Health Informatics, Coiera

Week 9 (a) & 11 (b)– E-Health and Telemedicine

- Difference between e-health and telemedicine.
- Current and proposed E-health applications.
- Economic and other benefits of e-health and telemedicine.
- Issues related to privacy/confidentiality and other barriers to telemedicine and the use of e-health applications.
- Interface between primary care and specialist services.
- Inter-hospital and intra-hospital communication.

Readings:

1. Chapter 21 “Clinical Communication and Telemedicine”, Guide to Health Informatics, Coiera
2. Chapter 16 “Telehealth ”, Handbook of Informatics for Nurses and Health Care Professionals, Hebda, Czar and Mascara.

Week 9 (b) – Guest Lecture

Week 10 (a) – Site Visit (IWK)

Week 10 (b) – Guest Lecture

Week 11 (a) – Site Visit (QEII)

Week 12 – Web-based health services

- Advantages and disadvantages of the Internet as platform for health services.
- Use of web to disseminate scientific knowledge.
- On-line education and decision making in health care.
- Patient accessibility of online healthcare information.
- E-consultation

Reading: Chapter 23 “Web Health Services”, Guide to Health Informatics, Coiera

Week 13 – Overview & Conclusions