**ISC 471/HCI 571 Fall 2012**

**Introduction to Biomedical Information Systems**

Instructor: Isabelle Bichindaritz, Ph.D.

Class: M/W/F Snygg 103 / Snygg 322 1:50 P.M. – 2:45 P.M.

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Office: Snygg 118

Office hours: M/W 10:30 A.M. – 11:20 A.M.

M/W 3 P.M. – 4 P.M.

 always by e-mail

 by appointment

Class Web-site: ANGEL and <http://cs.oswego.edu/~bichinda/isc471-hci571>.

**CATALOG DESCRIPTION**

The course is an introduction to technologies and practices in medical, health, and biological information systems. Topics include terminology, data sets, relational, and distributed databases, privacy, computer and network security, web services, human-computer interaction, and emerging trends. Students engage in projects which apply computing and information technologies to one or more areas of these information systems.

**OBJECTIVES**

HCI 571 introduces students to biomedical information systems concepts and skills. Upon successful completion of the course, the students will be able to:

* Articulate institutional, social, and cultural aspects of the health care environment, as well as discuss ethical and legal issues associated with the medical field.
* Read and analyze scientific publications in information technology applied to biomedical information systems.
* Specify and evaluate computer security criteria for biomedical web services, and relational database applications.
* Use their acquired knowledge of health care data sets to code data, construct relational databases, write queries for report generation, and analyze data.
* Apply concepts and practices from artificial intelligence, human-computer interaction, data visualization, web technologies, and simulations to medical information systems.

**TOPICS**

1. Healthcare system and health information management profession.
2. Human resource management and operational management.
3. Resource planning.
4. Patient privacy and legal constraints.
5. Health informatics technologies.
6. Health data concepts and methods.
7. Electronic health records.
8. Classification systems and coding.
9. Information security.
10. Health information management.
11. Data summarization with statistics.
12. Data analysis.
13. Information systems evaluation.
14. Artificial intelligence and decision-support systems in health sciences.
15. Simulation science and robotics in medicine.
16. Human-computer interaction, new media, and visualization in medicine.
17. Internet and associated technologies in health sciences.

Detailed tentative schedule for each class, assignments, project, and schedules can be found at the class home page on ANGEL (<http://www.oswego.edu/academics/angel.html>) and at <http://cs.oswego.edu/~bichinda/isc471-hci571>.

**PREREQUISITES**

HCI571: HCI graduate standing or instructor permission.

ISC471: ISC senior standing or instructor permission.

**TEXTBOOK**

Health information. Management of a strategic resource. M. Abdelhak, S. Grostick, M.A. Hanken, E. Jacobs. 4th edition, Saunders, Elsevier, 2007, ISBN 1416030026.

Additional readings will be posted on the class Web-site during the course of the semester.

**CLASS WORK AND EVALUATION**

Undergraduate students

There will be generally **bi-weekly assignments** or deliverables due, and **two midterms**. The last assignment takes the form of an explanatory article of the data analyses achieved in previous assignments. Some of the assignments involve analytical skills, writing competence, or light programming. Assignments are due by midnight on the due date, and will be submitted electronically in Angel drop-box. The deliverables will all be individual. Assignments and deliverables are posted on the class Web site. Incomplete assignments will be accepted. No late assignment will be accepted.

Graduate students

In addition to the assignments for undergraduate students, the coursework involves:

1. a **project** with milestones
2. an in-class **technical presentation**
3. a **writing portfolio** (containing all non-project related assigned writings)
4. active **participation**.

Throughout, it is assumed that you have writing competence at the level of a graduating undergraduate. If you feel that you need to address weaknesses in this area (and I may aid you in pointing this out), then now is a good time to do so. The Writing Center on campus is an excellent starting point for helping with this.

**GRADING**

Undergraduate students

Labs/assignments: 40%

First midterm: 20%

Second midterm: 20%

Explanatory article: 10%

Participation: 10%

Graduate students

Labs/assignments: 20%

Project: 30%

Portfolio: 30%

Presentation: 10%

Participation: 10%

**BONUS**

I encourage, and reward, individual efforts to build a community of active learners. Efforts to participate in class will be awarded bonus points in the class, up to 5%. These efforts, that I will monitor, are, among others:

* Active and constructive participation in the online discussion forum found on the class Web-site.
* Class presence and participation.
* Proposing solutions for exercises in class.
* Submitting answers to online intermediate course evaluations.

**COURSE CHANGES**

The schedule and procedures for this course are subject to change. Changes will be announced in class and it is the student's responsibility to learn and adjust to changes.

**CODE OF CONDUCT**

The assignments, and of course the quizzes, and exams **need to be done individually. *Copying of another student's work or code, even if changes are subsequently made, is inappropriate, and such work or code will not be accepted***. The University has very clear guidelines for academic misconduct, and they will be enforced in this class.

**IMPORTANT**

If you have a disabling condition which may interfere with your ability to successfully complete this course, please contact the Disability Support Services (DSS) located at 155 Campus Center, phone (315) 312-3358, dss@oswego.edu.

**TENTATIVE SCHEDULE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Day** | **Date** | **Subject** | **Pre-reading** |
| **M** | **8/27** | **Introduction to class** | **Chapter 1** |
| **W** | **8/29** | **Context – Healthcare systems** | **Chapter 1** |
| **F** | **8/31** | **Context – Health information systems profession** | **Chapter 2** |
| **M** | **9/3** | **Labor Day (NO CLASS)** |  |
| **W** | **9/5** | **Writing annotated bibliographies** | **Handout** |
| **F** | **9/7** | **Context - Human resource management** | **Chapter 16** |
| **M** | **9/10** | **Context - Operational management** | **Chapter 17** |
| **W** | **9/12** | **Context - Financial resources matters** | **Chapter 18** |
| **F** | **9/14** | **Context – Patient privacy and legal matters** | **Chapter 15** |
| **M** | **9/17** | **Rosh Hashanah (NO CLASS)** |  |
| **W** | **9/19** | **Review** |  |
| **F** | **9/21** | **FIRST MIDTERM** |  |
| **M** | **9/24** | **Data – Health information infrastructure** | **Chapter 3** |
| **W** | **9/26** | **Yom Kippur (NO CLASS)** |  |
| **F** | **9/28** | **Data – Health data concepts** | **Chapter 4** |
| **M** | **10/1** | **Data – Electronic health records** | **Chapter 5** |
| **W** | **10/3** | **Data – Classification and coding** | **Chapter 6** |
| **F** | **10/5** | **Data – Classification and coding examples** |  |
| **M** | **10/8** | **Data – Data access and retention** | **Chapter 7** |
| **W** | **10/10** | **Data – Technological landscape** | **Chapter 8** |
| **F** | **10/12** | **Data – Creating databases** |  |
| **M** | **10/15** | **Data – Querying databases** |  |
| **W** | **10/17** | **Data – Managing the electronic health record** | **Chapter 10** |
| **F** | **10/19** | **Data – Statistics** | **Chapter 11** |
| **M** | **10/22** | **Data – Research and epidemiology** | **Chapter 12** |
| **W** | **10/24** | **Review** |  |
| **F** | **10/26** | **SECOND MIDTERM** |  |
| **M** | **10/29** | **Data – Information systems evaluation** | **Chapter 13** |
| **W** | **10/31** | **Data – Data analysis** | **Chapter 14** |
| **F** | **11/2** | **Data – Data analysis examples** |  |
| **M** | **11/5** | **Artificial intelligence in medicine** | **Article** |
| **W** | **11/7** | **Bioinformatics**  | **Article** |
| **F** | **11/9** | **Clinical decision support systems** | **Article** |
| **M** | **11/12** | **Evaluation of clinical decision support systems** | **Article** |
| **W** | **11/14** | **Robots in the clinic** | **Article** |
| **F** | **11/16** | **Simulations in healthcare** | **Article** |
| **M** | **11/19** | **Human computer interfaces for the disabled** | **Article** |
| **W** | **11/21** | **Thanksgiving (NO CLASS)** |  |
| **F** | **11/23** | **Thanksgiving (NO CLASS)** |  |
| **M** | **11/26** | **Visualization in biomedicine** | **Article** |
| **W** | **11/28** | **Internet technologies** | **Article** |
| **F** | **11/30** | **Semantic Web** | **Article** |
| **M** | **12/3** | **Computer mediated communication** | **Article** |
| **W** | **12/5** | **Smart environments** | **Article** |
| **F** | **12/7** | **Advanced topics in biomedical health information Systems: the future** | **Article** |
| **M** | **12/10****2pm – 4pm** | **FINAL PRESENTATIONS** |  |