OBJECTIVES

The goal of the Kaiser-OHSU Informatics Course is to provide a detailed overview of biomedical and health informatics to those who will work at the interface of healthcare and information technology (IT). The course also aims to provide an entry point for those wishing further study (and/or career development) in the field. It provides a broad understanding of the field from the vantage point of those who implement, lead, and develop IT solutions for improving health, healthcare, public health, and biomedical research. It provides up-to-date details on current events in the field, including the “meaningful use” of electronic health records specified by the Health Information Technology for Economic and Clinical Health (HITECH) Act. The course also covers important emerging topics in the field, such as healthcare data analytics, patient engagement, and personalized/precision medicine. Although the course has a clinical orientation, many non-clinicians working in health IT environments have found the course accessible and the knowledge gained invaluable to their professional development.

INSTRUCTOR

The instructor for the course is William Hersh, MD. The best way to reach him is via email (hersh@ohsu.edu). Dr. Hersh does not keep regular office hours but phone calls or meetings can be arranged with him. He also maintains a blog, Informatics Professor.

COURSE COORDINATION

The course is offered in two parts:

2. An intensive one-day in-person session held in June, 2015 (exact date to be determined). The in-person session brings participants together to integrate the material, allow presentation of course projects, and meet the instructor as well as other students in person.

The course provides a broad overview of the field, highlighting the key issues and challenges for the field. The course is taught in a completely asynchronous manner, i.e., there are no "scheduled" classes. However, students must keep up with the course materials so they can benefit from the interactive discussion with faculty and other students. The course uses the following teaching modalities:

- Voice-over-PowerPoint lectures - The key material is delivered using Flash, HTML 5, or a special iPad player. As such, the content is easily accessed by any type of connection to the Internet.
- Interactive threaded discussion - Students engage in discussion on important issues using the on-line threaded discussion forums. An on-line faculty moderator helps keep the discussion on track.
- Reading assignments - The course uses a variety of readings made available to students.
- Homework/quizzes - Each of the units is accompanied by a 10-question multiple-choice self-assessment that aims to have the student apply the knowledge from the unit.

The on-line part of the course is accessed via OHSU’s Sakai learning management system (LMS). At the onset of the course, each student is provided a login and password by the OHSU distance-learning staff, who also provide technical support for the course. The course has no required textbook; with all assigned readings either freely available on-line or provided by OHSU. Students are expected to keep up with the materials and should anticipate spending 4-8 hours per unit on the course. All on-line activities are asynchronous, so there is no specified time that a student must be on-line.
Students must complete all homework/quizzes, the course project (see below), and participate in class discussions to receive the full 46.5 AMA PRA Category 1 CME Credit(s)™.

WHEN PROBLEMS ARISE

It is critical to contact the appropriate person when problems arise:

- For basic Sakai problems (cannot log in, something not apparently working) and course issues (e.g., unit or discussion forum not posted when it should be), contact the Sakai Help Desk at 877-972-5249 or sakai@ohsu.edu. The Sakai Help Desk hours are 8 a.m. – 10 p.m. Pacific Mon-Fri and 12-5 p.m. Pacific weekends and holidays.
- For questions about course content (e.g., do not understand a topic or disagree with homework quiz answer), contact the Teaching Assistant (TA), who will be announced at the beginning of the course.

When appropriate, all issues will be elevated to Dr. Hersh. While Dr. Hersh does not maintain scheduled office hours, he is readily accessible via email and will respond within 24-48 hours. Appointments to discuss course matters by phone or in person can be arranged via email.

COURSE INTERACTION

Even though the course is on-line, it provides a great deal of interaction among the faculty, teaching assistants, and students. A discussion forum is set up for each unit of the course, where students can pose questions, comments, and opinions related to the course materials. The instructor poses 1-2 questions to kick off the discussion but students are encouraged to post their own questions and engage in discussion with their classmates.

COURSE PROJECT

Students must complete a course project to obtain full credit for the course. The goal of the project is to identify an informatics problem in your local setting (e.g., where you practice or work, or otherwise have access) and propose a solution based on what is known from informatics research and best practice. The project write-up is due by March 18, 2015. (If you do not have access to a health care setting, you can do the project in another setting, such as a company or organization. The instructor can help if you have a challenge with this.) The problem and solution should be written into a succinct 2-3 page (please no longer!) document that should include references that justify the framing of the problem and the proposed solutions. This is submitted in a Word document uploaded to Sakai.

Students will present their project to their colleagues at the in-person session. The room at the in-person session has round tables, and students will break into small groups around the tables. Each group selects one individual to present an overview of the group's discussion. The remaining people in the group serve as discussants in a short (10-15 minute) panel presentation at the session.

CURRICULUM AND DATES

The following table outlines the curriculum with unit number, topic, date posted, and date due. The course in general runs with two weeks in a row of posted materials and then a third week to finish the work. The due date for each unit is when the next cycle of material is posted. We are lenient about giving extensions but participants are strongly encouraged not to fall behind, since it is difficult to catch up once one is too far behind.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>Date Posted</th>
<th>Date Due</th>
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<td>1</td>
<td>Overview of Field and Problems Motivating It</td>
<td>2/25/15</td>
<td>3/18/15</td>
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<tr>
<td>2</td>
<td>Biomedical Computing</td>
<td>3/4/15</td>
<td>3/18/15</td>
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<tr>
<td>3</td>
<td>Electronic and Personal Health Records (EHR, PHR)</td>
<td>3/18/15</td>
<td>4/8/15</td>
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<tr>
<td>4</td>
<td>Standards and Interoperability</td>
<td>3/25/15</td>
<td>4/8/15</td>
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7. Protection and Analytical Use of Data 4/29/15 5/20/15
8. Information Retrieval and Digital Libraries 5/6/15 5/20/15
9. Imaging Informatics and Telemedicine 5/20/15 6/10/15
10. Research Informatics 5/27/15 6/10/15

READINGS

The course has no required textbook. Students are provided assigned readings from 1-3 key articles or reports for each unit. Students are also provided comprehensive lists of references for topics covered in the lectures.

In addition, there are two optional textbooks that students may want to consider, for which a table below lists chapters appropriate for each unit in the course:


The reading assignments from these books are optional, and no material will appear on the homework quizzes or final exam that is not also covered in the class. But some students prefer to also read a textbook when learning. The appropriate chapter readings for each unit in the course are as follows:

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<tr>
<th>Unit</th>
<th>Topic</th>
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<tr>
<td>1</td>
<td>Overview of Field and Problems Motivating It</td>
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<tr>
<td>2</td>
<td>Biomedical Computing</td>
<td>5, 6</td>
<td>7, 11</td>
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<tr>
<td>3</td>
<td>Electronic and Personal Health Records (EHR, PHR)</td>
<td>2, 12, 17</td>
<td>2, 4</td>
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<tr>
<td>4</td>
<td>Standards and Interoperability</td>
<td>7, 8</td>
<td>6</td>
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<td>5</td>
<td>Meaningful Use of the EHR</td>
<td>13, 22</td>
<td>5, 15, 16, 17</td>
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<tr>
<td>6</td>
<td>EHR Implementation and Evaluation</td>
<td>11, 15, 16</td>
<td>10, 21</td>
</tr>
<tr>
<td>7</td>
<td>Protection and Analytical Use of Data</td>
<td>3, 10</td>
<td>3, 8, 14</td>
</tr>
<tr>
<td>8</td>
<td>Information Retrieval and Digital Libraries</td>
<td>21</td>
<td>12, 13</td>
</tr>
<tr>
<td>9</td>
<td>Imaging Informatics and Telemedicine</td>
<td>9, 18, 20</td>
<td>18, 19</td>
</tr>
<tr>
<td>10</td>
<td>Research Informatics</td>
<td>24, 25, 26</td>
<td>20, 22</td>
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</tbody>
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DETAILED COURSE OUTLINE

1.0 Overview of Field and Problems Motivating It
1.1 What is Biomedical and Health Informatics?
1.2 A Discipline Whose Time Has Come
1.3 Problems in Healthcare Motivating Biomedical and Health Informatics
1.4 Who Does Biomedical and Health Informatics?
1.5 Seminal Documents and Reports
1.6 Resources for Field - Organizations, Information, Education

2.0 Biomedical Computing
2.1 Types of Computers
2.2 Data Storage in Computers
2.3 Computer Hardware and Software
2.4 Computer Networks
2.5 Software Engineering

3.0 Electronic and Personal Health Records (EHR, PHR)
3.1 Clinical Data
3.2 History and Perspective of the Health (Medical) Record
3.3 Definitions and Key Attributes of the EHR
3.4 Benefits and Challenges of the EHR
3.5 EHR Examples
3.6 Personal Health Records

4.0 Standards and Interoperability
4.1 Standards and Interoperability: Basic Concepts
4.2 Identifier and Transaction Standards
4.3 Message Exchange Standards
4.4 Terminology Standards
4.5 Natural Language Processing of Clinical Text

5.0 Meaningful Use of the EHR
5.1 Patient Safety and Medical Errors
5.2 Healthcare Quality
5.3 Clinical Decision Support (CDS)
5.4 Computerized Provider Order Entry (CPOE)
5.5 Health Information Exchange (HIE)
5.6 HITECH and Achieving Meaningful Use

6.0 EHR Implementation and Evaluation
6.1 Clinical Workflow Analysis and Redesign
6.2 System Selection and Implementation
6.3 Evaluation of Usage, Outcomes, and Cost
6.4 Nursing Informatics
6.5 Public Health Informatics
6.6 Patient Engagement

7.0 Protection and Analytical Use of Data
7.1 Privacy, Confidentiality, and Security
7.2 HIPAA Privacy and Security Regulations
7.3 Evidence-Based Medicine
7.4 Clinical Practice Guidelines
7.5 Healthcare Data Analytics

8.0 Information Retrieval and Digital Libraries
8.1 Information Retrieval
8.2 Knowledge-based Information
8.3 Content
8.4 Indexing
8.5 Retrieval
8.6 Research: Evaluation and Future Directions
8.7 Digital Libraries

9.0 Imaging Informatics and Telemedicine
9.1 Imaging in Health Care
9.2 Modalities of Imaging
9.3 Digital Imaging
9.4 Telemedicine: Definitions, Uses, and Barriers
9.5 Efficacy of Telemedicine

10.0 Research Informatics
10.1 Clinical Research Informatics
10.2 Translational Bioinformatics
10.3 Overview of Basic Molecular Biology
10.4 Personalized/Precision Medicine