Providence-OHSU Informatics Course

Logistics, Detailed Curriculum, Learning Objectives, and Other Information

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The Providence-OHSU Informatics course and program is a unique partnership between Providence Health & Services (PH&S) and the Department of Medical Informatics & Epidemiology of Oregon Health & Science University (OHSU). The course addresses the need for a greater understanding of biomedical and health informatics by operational and clinical employees in any health care setting. It provides a broad overview of all information technology systems in healthcare, with a focus on their clinical and financial value. The course is co-taught with Providence faculty and will address PH&S/Swedish-centric problem-solving.

This offering of the course will run from January through April, 2014. The course is delivered online with two on-site sessions (which can be attended by videoconference by those not in Portland) taking place in the middle and at the end of the course. Tuition remuneration is available through PH&S.

Objectives

The goal of the Providence-OHSU Informatics Course is to provide a detailed overview of biomedical and health informatics to Providence employees and others who work (or desire to work) at the interface of healthcare and information technology. The course also aims to provide an entry point for those wishing further study (and 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 of the American Recovery and Reinvestment Act (ARRA, also known as the US economic stimulus package).

The Providence-OHSU Informatics Course is an adaptation of the well-known 10x10 ("ten by ten") course offered by OHSU and the American Medical Informatics Association. The course also allows those who successfully complete it (and are eligible for graduate education, i.e., have a bachelor's degree) to enroll in the OHSU biomedical informatics graduate program to pursue further courses and/or a graduate degree.

Course Logistics

The course is offered in two parts:

1. A 10-unit Web-based component that is provided through readings, voice-over-Powerpoint lectures, interactive discussion, and self-assessment tests. This portion of the course will start on January 8, 2014 and run through April 23, 2014.
2. Two in-person sessions locally at a Providence location (with capability for others to participate remotely) that brings attendees together to integrate the material, allow presentation of course projects, and meet other students. The first session will be mid-way through the course while the final session will be prior to the optional final exam. (Exact dates to be determined, likely to be in late February and again in late April.)

This course and the 10x10 course itself are adaptations of the on-line Introduction to Biomedical Informatics class currently taught in the OHSU biomedical informatics education program. This survey 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 - These are delivered using the Flash plug-in, which is freely available and already installed in almost all Web browsers. The content is easily accessed by any type of connection to the Internet.
- Interactive threaded discussion - Students engage in interactive discussion on important issues using on-line discussion forums.
- Reading assignments - The course uses supplemental readings as necessary. In addition, students are pointed to key documents, reports, and papers from the field.
- 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 the Sakai course delivery tool. 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. Students are expected to keep up with the materials each week and participate in ongoing discussion. They 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.

The goal of the course project is for students to identify an informatics problem in their local setting (e.g., Providence work setting) and propose a solution based on what is known from informatics research and best practice. It is due before the in-person session at the end of the course. If a student does not have access to a health care setting, they can do the project in another setting, with permission of the instructor. Here are the details of the assignment:

- You should assess some local setting (in your work environment, practice, hospital, etc.) to identify an informatics-related problem or a problem that could be improved by an informatics solution.
- Based on your knowledge of research and best practices in informatics, you should propose a solution to the problem.
- The problem and solution should be written into a 2-3 page document that should include references that justify the framing of the problem and the proposed solutions.
- The problem and solution should be presented at the second in-person setting.

The Providence-OHSU Informatics Course has no required final exam. At the end of the course, an optional final exam is given for those who are eligible and desire graduate-level
academic credit for the course from OHSU. The exam is an open-book, take-home final exam that is completed over a one-week period. Credit is typically sought by those desiring further study in biomedical and health informatics. More information about the final exam and how to enroll at OHSU to receive academic credit is provided once the course has started.

Readings

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

Instructor

The instructor for the course is William Hersh, MD. The best way to reach him is via email (hersh@ohsu.edu). You may also find interesting reading in his blog.

Syllabus

The following table outlines the curriculum with unit number, topic, and reading assignment. 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 can be difficult to catch up.

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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<tbody>
<tr>
<td>1</td>
<td>Overview of Field and Problems Motivating It</td>
<td>1/8/14</td>
<td>1/29/14</td>
</tr>
<tr>
<td>2</td>
<td>Biomedical Computing</td>
<td>1/15/14</td>
<td>1/29/14</td>
</tr>
<tr>
<td>3</td>
<td>Electronic and Personal Health Records (EHR, PHR)</td>
<td>1/29/14</td>
<td>2/19/14</td>
</tr>
<tr>
<td>4</td>
<td>Standards and Interoperability</td>
<td>2/5/14</td>
<td>2/19/14</td>
</tr>
<tr>
<td>5</td>
<td>Meaningful Use of the EHR</td>
<td>2/19/14</td>
<td>3/12/14</td>
</tr>
<tr>
<td>6</td>
<td>EHR Implementation and Evaluation</td>
<td>2/26/14</td>
<td>3/12/14</td>
</tr>
<tr>
<td>7</td>
<td>Protection and Analytical Use of Data</td>
<td>3/12/14</td>
<td>4/2/14</td>
</tr>
<tr>
<td>8</td>
<td>Information Retrieval (Search)</td>
<td>3/19/14</td>
<td>4/2/14</td>
</tr>
<tr>
<td>9</td>
<td>Imaging Informatics and Telemedicine</td>
<td>4/2/14</td>
<td>4/23/14</td>
</tr>
<tr>
<td>10</td>
<td>Translational Bioinformatics and Personalized Medicine</td>
<td>4/9/14</td>
<td>4/23/14</td>
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</table>

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

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 Clinical Research Informatics
7.6 Analytics and Business Intelligence
8.0 Information Retrieval (Search)
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

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
9.6 Patient-Clinician Communications

10.0 Translational Bioinformatics and Personalized Medicine
10.1 Bioinformatics - The Big Picture
10.2 Overview of Basic Molecular Biology
10.3 Important Biotechnologies Driving Bioinformatics
10.4 From Clinical Genetics and Genomics to Personalized Medicine
10.5 Bioinformatics Information Resources
10.6 Translational Bioinformatics Challenges and Opportunities

Beyond the Course

The goal of the Providence-OHSU Informatics Course is to train clinicians and other health care professionals in informatics so they can be knowledgeable participants in IT implementations in their local settings. The program is structured to allow those who complete the course to carry the credits forward into OHSU’s informatics graduate programs.

Since the course is an adaptation of the introductory course in the OHSU biomedical informatics, those who complete the course are able to obtain credit for the course in the OHSU program. Before enrolling in the OHSU Graduate Certificate or Master’s Degree program, students need to pass the (optional) final examination for the course that is offered at its conclusion. Upon passing the final exam and enrolling in the program, they are awarded three credits in the OHSU graduate program. (OHSU is on an academic quarter system, with each quarter consisting of 11 weeks of instruction. A three-credit course is comparable to a course with three contact hours per week plus additional work for reading assignments, homework, and projects.) Most of OHSU’s informatics courses are taught on-campus and on-line, and each course is considered equivalent whether it is taught live or via distance.

The OHSU Biomedical Informatics Graduate Program is designed in a "building block" fashion, so work done at a lower level can be carried forward to higher levels. Students who have completed the Providence-OHSU Informatics Course have gone on to graduate from the Graduate Certificate as well as the Master’s Degree.
More details about the individual degree programs are available on the [OHSU informatics education Web site](https://informatics.ohsu.edu/), but the following table provides an overview of the programs.

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Description</th>
<th>Admission Requirements</th>
<th>Graduation Requirements</th>
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<tbody>
<tr>
<td><a href="https://informatics.ohsu.edu/graduation/certificate">Graduate Certificate in Biomedical Informatics</a></td>
<td>Core courses in informatics</td>
<td>Bachelor's degree in any field</td>
<td>24 credits (generally 8 3-credit courses)</td>
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<tr>
<td><a href="https://informatics.ohsu.edu/graduation/masters">Master of Biomedical Informatics</a></td>
<td>&quot;Professional&quot; master's degree with capstone project</td>
<td>Bachelor's degree in any field plus introductory courses in Computer Science and Anatomy &amp; Physiology</td>
<td>52 credits (46 hours of instruction plus 6 hours of capstone project)</td>
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<tr>
<td><a href="https://informatics.ohsu.edu/graduation/masters">Master of Science in Biomedical Informatics</a></td>
<td>&quot;Research&quot; master's degree with master's thesis</td>
<td>Bachelor's degree in any field plus introductory courses in Computer Science and Anatomy &amp; Physiology</td>
<td>60 credits (48 hours of instruction plus 12 hours of master's thesis)</td>
</tr>
<tr>
<td><a href="https://informatics.ohsu.edu/graduation/doctoral">Doctor of Philosophy (PhD) in Biomedical Informatics</a></td>
<td>PhD program for advanced leaders and research in the field</td>
<td>Bachelor's degree in any field plus introductory courses in Computer Science and Anatomy &amp; Physiology</td>
<td>135 credits, including dissertation</td>
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The Web site also has information about OHSU's [National Library of Medicine-funded fellowship program](https://informatics.ohsu.edu/grants/fellowship), [Graduate Certificate Track in Health Information Management (HIM)](https://informatics.ohsu.edu/graduation/certificate), and [master's degree programs in bioinformatics](https://informatics.ohsu.edu/graduation/masters).