SPPH 302
Course Syllabus

Course General Info

Course Title: Topics in Health Informatics for Health/Life Sciences Students

Course Level: Undergraduate

Credit Value: 3 hours

Course Location & Times:

Room:
Thursday Afternoons – 3 Hour Session

Instructor Contact Info & Office Hours:

Larry Frisch M.D., M.P.H.
Clinical Professor, School of Population and Public Health

Communication with Instructor:

Email through the course CANVAS site is the best way to communicate. I will answer emails within 24 hours. In case of an emergency – contact me through lefrisch@gmail.com and please put the course number (SPPH 302) on the message title so that I know the message is from a student.

Course Description

Health Informatics is a study at the crossroads of medicine, technology and information science. This course is an introduction to the field, providing a foundation for those interested
in further study around computers and information science in the life and health sciences. While we will consider informatics across a broad range of healthcare services, we will look whenever relevant at applications affecting public health practice.

**Intended Students**

SPPH 302 presupposes little prior computing background. You’ll need to be able to load programs on your PC or Mac and access a variety of sites on the Web. The rest should take care of itself! This a course for students with background in biology and/or health who want to learn what informatics tools will likely be adding to their discipline over the coming years (and what’s already there!) It is also a course that should be useful for students who already have a solid background in computer science but want an introduction to the special challenges (and vocabulary) of healthcare.

**Course Learning Objectives**

These are the learning objectives as approved by UBC:

**Overall Goal:** To acquaint students with a range of topics linking the tools of informatics with specific challenges in health care delivery and the assessment and maintenance of public and population health.

Upon completion of SPPH302 the student will be able to:

1. Outline the origin and history of health informatics and explain associated terms.
2. Describe health informatics, its uses, potential, pros and cons, current issues and impact on practice.
3. Explain various purposes of data in the health context, how data can be stored and queried in health applications and quality assurance methods in data management.
4. Explore a variety of health informatics innovations to assist in providing quality healthcare, for example, to:
   - retrieve information and manage data across various professional fields;
   - assist in clinical decision making;
   - collaborate and communicate, particularly across professions;
• assist in health services in remote and rural locations.

5. Examine how innovations and issues in health informatics might apply to a specific healthcare scenario and within various healthcare professions.

6. Outline security, privacy and ethical issues pertaining to health informatics in various professional contexts.

7. Describe the characteristics, principles and standards of computer science in health applications.

8. Identify human factors in health informatics, such as workflow, knowledge translation, education and change management,

9. Outline methods and tools that might assist in managing these.

10. Assess the strengths and weaknesses of a variety of HI options as they pertain to a chosen health problem and target population;

11. Provide a rationale for selecting a particular strategy;

12. Explain different approaches for evaluating eHealth technologies and interventions.

Learning Environment

Course learning will take place in our 3 hour classroom meetings each week, and here on the course website where you will be able to interactive asynchronously with each other and with the instructor.

We have a lot of guest lectures in this course. You will hear from experts in health informatics, those who work in business, programming, and healthcare delivery as well as researchers and academics.

There is no course textbook, but there will be a variety of other readings and video presentations that we hope will add to your learning enjoyment and accomplishment.

We want you to enjoy our half dozen session in which you will have a chance to participate in debates on contentious topics related to healthcare delivery and informatics. These should be fun, and at the same time we expect everyone will learn a good deal from the debate process.
We support a student-centred active learning environment to help further develop your capacity for critical thinking and intellectual growth. With this in mind, you will be challenged to:

- Be prepared by having readings and exercises completed before class time
- Actively participate in class and seminar discussions
- Critically assess information sources
- Work collaboratively with classmates and faculty

Some of your work will be carried out individually, but two of your major assignments will be completed in small groups of 6-8 students. The groups will be randomly assigned in CANVAS.

**OPTIONAL Textbook:**


**Required (free) Software**

1) SocNetV – Social Network Visualizer


**What is SocNetV?**

Social Network Visualizer (SocNetV) is an open-source project to build a flexible and user-friendly, cross-platform tool for the analysis and visualisation of social networks, targeting primarily the social researcher. The application offers an easy GUI. Your major class project will be the group creation of a social network model using SocNetV. This project is described in considerable detail in the course assignments section.

A **Social Network** is the social structure which facilitates communication between a group of **actors** (individuals or organizations) that are related somehow (i.e. by common interests, shared values, financial exchanges, friendship, dislike, etc).

For instance, your friends and you form a social network. But, social networks operate on many more levels, from family relations and disease spreading up to the level of company strategies, social
movements or even nations. Furthermore, research in many scientific areas has shown that social networks are important when we study the way problems are solved, diseases are spreaded, organizations are run, and the degree to which individuals succeed in achieving their goals.

*Social Network Analysis* (SNA) is a beautiful blend of Sociology and Mathematics, composed of various interdisciplinary techniques for the study of such social networks.

SNA researchers conceptualize social relationships in terms of *nodes* and *edges* (links) in *mathematical graphs*.

Nodes represent the individual *actors* within the networks, while edges visualise the relationships between those actors.

The result is graph-based structures which are often very complex.

Below you will see an example of a social network created by students in a previous SPPH 302 class. You can see that these networks can be both complex and quite beautiful.
You can find the SocNetV manual here: [http://socnetv.sourceforge.net/docs/index.html](http://socnetv.sourceforge.net/docs/index.html). I've excerpted the introduction above, and you may want to read the section on user interface. However, since we will be using only the most basic features of SocNetV, much of the manual's content will be beyond the scope of our course. In the assignments section of CONNECT you will find more details, and I have also created a Camtasia video on using SocNetV. If you want a quick YouTube intro take a look at [https://www.youtube.com/watch?v=ti-98tlzfeK](https://www.youtube.com/watch?v=ti-98tlzfeK). It's a bit chatty and goes into more detail than we'll need, but you might enjoy watching some of it.

2) InputHealth and SpringCharts

You will set up and use an “industrial strength” EMR, but one that past students have found pretty easy and intuitive to use. It is also quite attractive and colourful and comes with a nice introductory tutorial. I describe how to find, load, and setup this program in the “Assignments” section of CANVAS. You will want to become familiar with the program fairly early on, but we won't be doing much with it for several weeks. The goal this year (2017) is to switch over to InputHealth, a unique interdisciplinary medical record system created by a Family Doctor in Vancouver and now used widely by physicians and clinics.

Because it has been observed that “when you’ve seen one EMR you’ve seen one EMR”, a part of our EMR experience will also involve an EMR called Springcharts which has a very different user interface and appearance. Springcharts closely resembles EMRs commonly in use here in BC and will provide you a useful comparison or two ways that EMRs can be designed and used.

In your InputHealth and Springcharts assignment you will enter some data about a patient with diabetes into both EMRs as if you were the doctor or nurse practitioner caring for that patient. In addition you will complete an “SF-36” measure of clinical outcomes as if you were a patient whom you meet on a youtube video and who describes there some of the experience of living with diabetes.

Course Schedule

<table>
<thead>
<tr>
<th>Week &amp; Date</th>
<th>Topic</th>
<th>Module Content</th>
<th>Assignments &amp; Dues</th>
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<tbody>
<tr>
<td>1 Sept 7</td>
<td>Course Overview, history of health informatics</td>
<td>There will be several readings and a video associated with this module. The class session will comprise an overall introduction to the course, an introduction to the field of health informatics, and some discussion of health literacy (and numeracy) as these</td>
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<td>2 Sept 14</td>
<td>Scheduling Appointments in the Healthcare System</td>
<td>You will have some readings and videos to complete on your own. The in-class session will introduce the essentials of database design through a set of online lectures by a Stanford University computer scientist. We will talk about how systems for making online appointments are constructed using an underlying database. During an in-class exercise you will work in ad-hoc groups to construct one of several example appointment systems. We will introduce the concepts of “XML” and “HTML” in the database context and help you to distinguish between these two formats which look superficially alike but are used widely in very different ways.</td>
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<td>3 Sept 21</td>
<td>Informatics and Diagnostic Imaging</td>
<td>Our focus this week is on the informatics of imaging: Xrays, CT Scans, MRIs, Ultrasound, and other related technologies. Through our readings and videos and in class we will explore how imaging systems are linked in ways that assure “interoperability” both with each other and with organizational electronic health record systems (EHRs). There will be an in-class group exercise to designed to illustrate these linkages more clearly.</td>
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<tr>
<td>4 Sept 28</td>
<td>Pharmacy Informatics / Nursing Informatics</td>
<td>In this module we will explore the worlds of two major constituents of the EHR: pharmacy (including drug ordering and administration to patients), and nursing</td>
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Quiz – Modules 1,2

Module “Problem” discussion – come prepared for debate (See this module’s page for debate proposition(s) and the debate assignment instructions for debating & summarizing groups.)

Don’t forget:
care. Pharmacists and nurses play highly significant roles in healthcare, and their work is increasingly involved with electronic systems of a variety of sorts. We will look at the risks of medication administration errors and how these risks are altered (improved in some situations and potentially worsened in others) by the introduction of electronic record systems. We will introduce the field of “human factors engineering” and the way in which practitioners in this field can help reduce risks of error in healthcare. Through readings and presentations in class we will discuss the important topic of medication reconciliation. We will have at least one guest lecturer for this session.

Laboratory data comprises a very large part of electronic health record systems, and the laboratory itself is often highly robotic with many computer-controlled systems interacting. The laboratory must receive orders from providers, obtain specimens such as blood, and return the results to the electronic record accurately, in a timely fashion, and with the involved patient clearly (and correctly) identified. Laboratory orders and results are communicated between computer systems by an important interoperability language known as HL-7. We will work with HL-7 during the course assignments and will find it first introduced here in some detail. The class session will be delivered by a distinguished laboratory informatician.

Like many other jurisdictions in Canada and elsewhere, BC’s Health Authorities are currently making a nearly billion dollar investment in electronic health record

Submit your Research Ethics Certificate by Oct. 1 !!

Group Project: Social Network Analysis Part 1 Due: Oct 12 midnight (only the network part, not the survey)

Social Network Project Part 1 DUE today!
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<th>Date</th>
<th>Topic</th>
<th>Description</th>
<th>Assignment</th>
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<tr>
<td>Oct 12</td>
<td>Change Management Technology</td>
<td>Implementation of such complex systems is often complicated by sometimes predictable and often unexpected “glitches.” In this session, your readings and class presentations will focus on organizational structure and behaviour, and on change management within organizations. We will also introduce public health informatics and some of the challenges of communicating between programs and their associated computer systems that were often designed without assuring easy interoperability with Electronic Health Records (or with each other.) Our class session will feature two distinguished guest lecturers.</td>
<td>Quiz – Modules 5,6</td>
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<td>7 Oct 19</td>
<td>An Informatics Case Study: Diabetes I: Decision Support</td>
<td>In this module we will pursue some of the themes of data standardization and harmonization introduced in the previous module. We will introduce the disease diabetes as an example of a chronic non-communicable disease whose interdisciplinary management can be facilitated by EHR systems. In our readings and the class session we will explore small area variation in healthcare, the principles of “evidence-based practice”, and EHR-related techniques for potentially reducing variability in the content and quality of healthcare. These techniques include computerized provider order entry (CPOE) and computer-based decision support.</td>
<td>Module “Problem” discussion – come prepared for debate (See this module’s page for debate proposition(s) and the debate assignment instructions for debating &amp; summarizing groups.)</td>
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<tr>
<td>8 Oct 26</td>
<td>An Informatics Case Study: Diabetes II: Public Health Informatics and Chronic Illness</td>
<td>In this module we will provide an introduction to Public Health, its work in a community and its informatics needs. We will talk about acquiring population-oriented data through surveys and about surveillance of the population for specific conditions – either chronic disease such as diabetes, or infectious disorders. Computer-based training is widely used in public health, and we will spend some time in class playing</td>
<td>Quiz – Modules 7,8</td>
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<td>Date</td>
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<td>9 Nov</td>
<td>The Informatics of Surgery</td>
<td>Video games designed to increase skills in outbreak investigation and in disaster response, two critically important areas of public health practice which can prove life-saving.</td>
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<td>this module’s page for debate proposition(s).)</td>
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<td>10 Nov</td>
<td>Topics in Privacy and Security</td>
<td>Through our readings and associated videos we will begin an exploration of the varied ways in which informatics potentially improves the quality and safety of surgery. Most surgery requires the administration of anesthesia, and no branch of medicine has made greater strides in improving safety over the past several decades than has anaesthesia. Some of these improvements have occurred through the use of simulation. In the class session we will explore the use of simulation in both anaesthesia and surgery practice. We will briefly discuss the fascinating role of robotics in surgery.</td>
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<td>Module “Problem” discussion – come prepared” for debate (See this module’s page for debate proposition(s).)</td>
<td>Mid-term Examination – will cover modules 1-8</td>
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Mid-term Examination – will cover modules 1-8

- Module “Problem” discussion – come prepared for debate (See this module’s page for debate proposition(s).)
- Quiz – Modules 9,10

Topics in Privacy and Security

- Through readings and an in class presentation by one of BC’s most distinguished privacy officers we will solidify our understanding of privacy, security and confidentiality. These three concepts are critically important in healthcare and can be challenged by the institution of large-scale electronic systems and data sharing across facilities. Some of the topics we will address include encryption, deidentification of records for research and other secondary uses, and the detection and response to data breaches. We will consider the concept of data stewardship, and likely have some discussion about who “owns” your clinical record and what say you
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<th>Date</th>
<th>Event</th>
<th>Details</th>
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<tr>
<td>11 Nov 16</td>
<td>Advances in Interconnectedness – Home Monitoring for the Elderly + telepsychiatry and teleoncology</td>
<td>„E-health“ practices including telemedicine (the delivery of healthcare remotely through systems of varying technical complexity) have the potential for revolutionizing healthcare, particularly in outlying areas of BC. Our readings and three speakers will introduce us to how telemedicine is currently used in BC and what the future of this important innovation might hold.</td>
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<td>12 Nov 23</td>
<td>Informatics and Public Health Surveillance</td>
<td>We will return in this module to the practice of public health surveillance in readings and in a session led by two distinguished epidemiologists from the BC CDC. We will talk in more detail about public health data: how it is acquired and how it is used in practice and in research.</td>
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<td>13 Nov 30</td>
<td>Windows into the Future</td>
<td>In our final class session we will take a stab at predicting the future. A panel of healthcare innovators will talk to us about how they see informatics may guide the changes in healthcare we are likely to see in the next decades.</td>
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<td>Tools for Healthcare Informatics Assignment Due: Nov 30(all four modules)</td>
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<td>Project: Full Social Network Survey Analysis Due: Dec 1 midnight</td>
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<td>Quiz – Modules 11,12,13</td>
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Course Evaluation

Your final grade will be based on the following course components.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Marks</th>
<th>%</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Group Project: Social Network Analysis Project</td>
<td>25</td>
<td>25</td>
<td>Social network diagram analysis due Module 5. Final report for this project due by end of class. See dates above and/or course calendar for specifics.</td>
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<td>Class and Online Debate Participation</td>
<td>10</td>
<td>10</td>
<td>The course summary &amp; calendar say Nov. 16 because the drop box needs to stay open for the last set of summaries. Your summary is due by midnight on the Sunday following the debate. (Extensions for this deadline may be requested, and if granted will not result in a late submission penalty.)</td>
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<td>Midterm Examination (in Canvas)</td>
<td>10</td>
<td>10</td>
<td>During Module 9</td>
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<td>Six Quizzes @ 5 marks each (in Canvas)</td>
<td>30</td>
<td>30</td>
<td>See Course Schedule. The quizzes open after class on Thursday and are accessible until midnight the following Sunday.</td>
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Detailed descriptions of each type of Assignments and on the examination/quizzes can be found on the Course Assignments and Graded Learning Activities page on course Connect website under Course Info > Course Assignments.

Grade Assignment and Final Grade will generally accord with the Faculty of Medicine’s Grading Policy outlined at:

www.calendar.ubc.ca/vancouver/?tree=3,42,96,0

More specifically, Grade Assignment and Final Grade will be given on the following Grading Schema:
## Assignment Policies

Written assignments are expected to be submitted on or before 11:59pm (midnight) on the stated due date. A request for an extension of the due date may be considered for unforeseen circumstances. Students must negotiate an extension at least 48 hours in advance of the due date. In the absence of prior permission, late Assignments will be docked 10% of the possible grade for each day/partial day (including holidays and weekend days) beyond the due date.

Group Project presentations cannot be made up by an alternative assignment. Students who miss the actual presentation of their group will be required to submit a video of their portion of the presentation no later than two weeks following that presentation. When physician-confirmed prolonged illness requires this deadline be extended beyond two weeks arrangements must be made directly with the instructor. There will be a five point deduction if the form describing contribution of each group member is not submitted at the time of presentation. Group members whose role is not described in this form will not receive credit for the assignment.
Diversity

Diversity: Please contact instructor if you need to coordinate an alternate testing environment.

Academic Integrity

You are expected to complete all non-group work on your own. Plagiarism will be managed as academic misconduct. Assignments suspected of plagiarism will be de-identified and screened through turnitin. UBC policy on academic misconduct is available at: http://vpacademic.ubc.ca/integrity/ubc-regulation-on-plagiarism