

SPPH 302

Course Syllabus

Course General Info

Course Title: Health Informatics

Course Level: Undergraduate

Credit Value: 3 hours

Course Location & Times:

Room: FSC 1221
Woodward IRC
2424 Main Mall
Thursday Afternoons – 1 to 4PM

Instructor Contact Info & Office Hours:

Larry Frisch M.D., M.P.H.

Clinical Associate Professor, School of Population and Public Health

Communication with Instructor:

Email through the course CONNECT 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

This is a course for students who already have a solid background in computer science but want an introduction to the special challenges (and vocabulary) of healthcare. It is also a course for students with background in biology and health who want to learn what informatics tools will likely be adding to their discipline over the coming years (and what's already there!)

Course Learning Objectives

These are the official learning objectives 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.
1. Describe health informatics, its uses, potential, pros and cons, current issues and impact on practice.
2. 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.
3. 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.
4. Examine how innovations and issues in health informatics might apply to a specific healthcare scenario and within various healthcare professions.

5. Outline security, privacy and ethical issues pertaining to health informatics in various professional contexts.
6. Describe the characteristics, principles and standards of computer science in health applications.
7. Identify human factors in health informatics, such as workflow, knowledge translation, education and change management,
8. Outline methods and tools that might assist in managing these.
9. Assess the strengths and weaknesses of a variety of HI options as they pertain to a chosen health problem and target population;
10. Provide a rationale for selecting a particular strategy;
11. 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.

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

OPTIONAL Textbook:

Eds Nelson, R., & Stagers, N. (2013). *Health Informatics: An interprofessional approach*. St. Louis: Mosby.

Required (free) Software

1) SocNetV – Social Network Visualizer

URL for download: <http://socnetv.sourceforge.net/>

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.

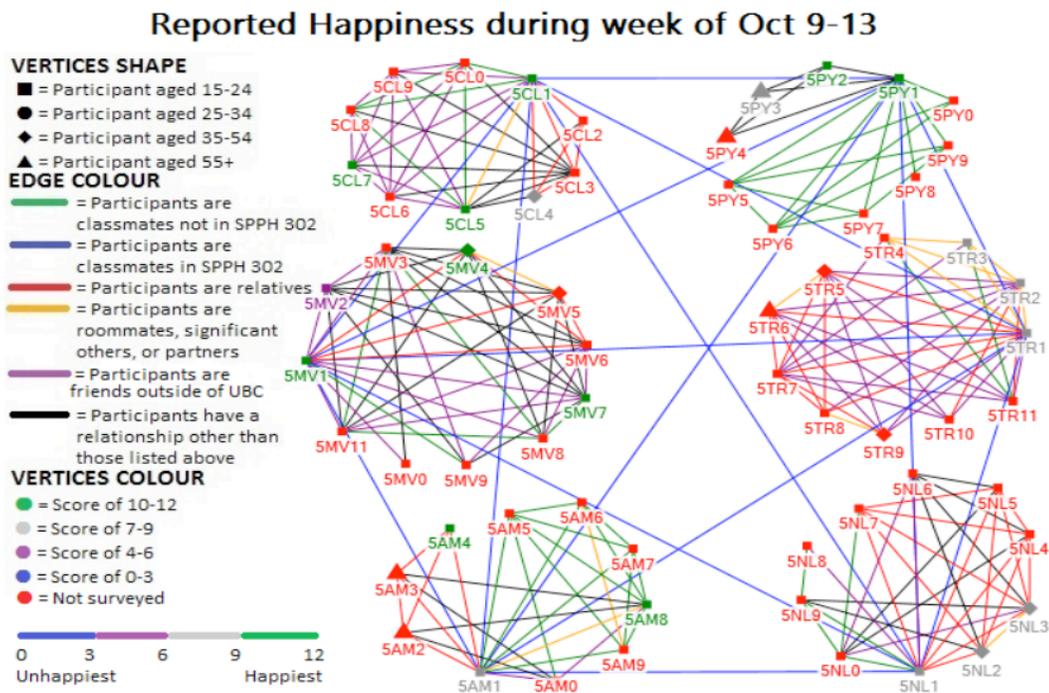
Social Network Analysis (SNA) is a beautiful blend of Sociology and Mathematics, composed of various interdisciplinary techniques for the study of such social networks.

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>. 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-98tIzfEk>. It's a bit chatty and goes into more detail than we'll need, but you might enjoy watching some of it.

2) SpringCharts Electronic Medical Record (EMR)

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 CONNECT. You will want to become familiar with the program fairly early on, but we won't be doing much with it for several weeks.

Course Schedule

| Week & Date | Topic | Required Readings | Assignments & Dues |
|------------------------------------|---|--|---------------------------|
| <p>1 Sept 8</p> | <p>Course Overview, history of health informatics</p> | <p>Medical Informatics Past and Future: Read pp. 726-734 in the chapter linked immediately above. If time allows you also might find sections 18.2.1 through 18.2.6 an interesting preview of some of this course's content. Some of you will want to take a look at the whole book (of which chapter 18 is the conclusion.)</p> <p>Journal Article: eHealth Literacy Among College Students: A Systematic Review With Implications for eHealth Education</p> <p>Video: What is Health Informatics?</p> | |
| <p>2 Sept 15</p> | <p>Scheduling Appointments in the Healthcare System</p> | <p>Two Videos: Database and SQL: https://www.youtube.com/watch?v=FR4QIeZaPeM</p> <p>This video correctly says that hierarchical databases are rarely used today , but be aware that “Epic,” one of the two most prevalent Electronic Health Record system in the US, with some installations in Canada, is based on a hierarchical database.</p> <p>Designing a Database for a clinic: https://www.youtube.com/watch?v=mxYy4OINoSo</p> <p>OK, it's long and chatty. But it goes through a number of steps involved with creating a basic clinic appointment system. I have mixed feelings about this video, but as 85,000 other viewers have found, there</p> | <p>Quiz – Modules 1,2</p> |

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| | | <p>isnt anything else like it.</p> <p>In class we'll be creating our own appointment system with a different database system, but the principles of this video should carry over.</p> | |
| <p>3 Sept 22</p> | <p>Informatics and Diagnostic Imaging</p> | <p>CT Scanning - youtube video (kind of lengthy, but really well done!)</p> <p>The basics: PACS, RIS, DICOM briefly defined.</p> <p>Not a bad description of PACS systems: Picture Archiving And Communication Systems (PACS) Implementation</p> <p>Journal Articles (2): "Voice recognition is here comma like it or not period."</p> <p>One possible future of radiology informatics</p> | <p>Module "Problem" discussion – come prepared for debate (See this module's page for problem text.)</p> |
| <p>4 Sept 29</p> | <p>Informatics and the Clinical Laboratory and Pharmacy</p> | <p>Dr. J.D. Nolen on laboratory automation.</p> <p>Short Lab automation videos:</p> <ul style="list-style-type: none"> Automation Sorting specimens by hand Mislabeling <p>Dealing with specimens with a problem that can't be corrected just at the lab: exceptions</p> <p>HL7 Introduction (video)</p> <p>HL7 Structure (video)</p> <p>Introduction to Snomed - video (This is a multipart video lecture. It's useful although it rambles a bit. I'd recommend you watch only Part 1, Part 3, and no more than 3 ½ minutes of Part 4. When the program transitions to Part 2 you can skip to Part 3 whenever you want.)</p> <p>Optional: Jones, R. G., Johnson, O. A., & Batstone, G. (2014). Informatics and the Clinical Laboratory. <i>The Clinical Biochemist Reviews</i>, 35(3), 177–192.</p> | <p>Quiz – Modules 3,4</p> |

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| <p>5 Oct 6</p> | <p>The Informatics of Referral to a Medical Specialist</p> | <p>Telemedicine in Rural Australia - video</p> <p>Video - International Classification of Diseases (ICD 10 CM) (Quite American in focus, but still useful.)</p> <p>Data and Interoperability Standards read at least page 244 (Clinical Standard Terminologies) to the end. Feel free to skip sections on ICD-9 (no longer used), DRG, and CPT (not used in Canada). You can skim or skip the HL-7 section, but be aware of the existence of FHIR (pp. 251 and 252.)</p> | <p>Module “Problem” discussion – come prepared for debate (See this module’s page for problem text.)</p> |
| <p>6 Oct 13</p> | <p>An Informatics Case Study: Diabetes I: The basics</p> | <p>Health Information Systems</p> <p>Human Factors Engineering and Human-Computer Interaction Read at least pp 287-291 and 297-299. If you're interested, read the whole chapter, but much of it is more detailed than we need for this course.</p> <p>Journal Article:</p> <p>Mobile Health Applications to Assist Patients with Diabetes: Lessons Learned and Design Implications.</p> | <p>Group Project: Social Network Analysis Part 1 Due: Oct 13 midnight (only the network part, not the survey)</p> <p>Quiz – Modules 5,6</p> |
| <p>7 Oct 20</p> | <p>An Informatics Case Study: Diabetes II: Decision Support</p> | <p>Evidence-Based Care – Read at least pages 101 through 106.</p> <p>Greenes: Features of Computer-Based Clinical Decision support - read sections 3.1.1 through 3.1.5</p> <p>Phillips L.S, et al. (2015) Translating What Works: A New Approach to Improve Diabetes Management. <i>Journal of Diabetes Science and Technology</i>. (available online through UBC library) link to PDF of article.</p> | <p>Module “Problem” discussion – come prepared” for debate (See this module’s page for problem text.)</p> |

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| 8 Oct 27 | An Informatics Case Study: Diabetes III: Public Health Informatics and Chronic Illness | <p>Introduction to Public health informatics page 8 (Purpose of Public Health Informatics) to page 11.</p> <p>Public Health Informatics in Canada read page 609 (GPHIN) through page 615.</p> <p>Journal Article:</p> <p>Development of a Virtual Diabetes Register using Information Technology in New Zealand</p> <p>SMS and diabetes prevention in India –video</p> <p>See this week’s module document for interesting optional reading.</p> | Quiz – Modules 7,8 |
| 9 Nov 3 | The Informatics of Surgery | <p>WHO Guidelines for Safe Surgery. Read pages 2 through 6</p> <p>Have an Apple or Android handheld device (including ipad)? Download a free App and practice your surgical skills.</p> <p>If you have a 64 bit computer (Windows or Apple) with a Chrome search engine installed you can add the “Arc Welder” app to Chrome and then go to an apk download website to get (I used http://apk-downloaders.com/, but http://apkleecher.com/ also works). Put the following in the “package name” box: com.touchsurgery. The touch surgery program should download. You can then open “Arc Welder” and locate the package in your downloads – on my computer it’s called “touch-surgery-medical-app 4.7.6_[www.Downloader-Apk.com].apk” You run it from within Arc Welder. When touch surgery opens you’ll have to register yourself as a health sciences student. If you can find the video on “Central Venous Line Insertion Phase 2” open it, otherwise you can try any of the ones that are offered. It took me a while to figure out how to locate the Central Venous Line video, and since the method is operating system specific it will be different on your machine than on mine running Linux.</p> <p>Putting in a central venous line was the first thing I was taught as an intern. Here’s an interesting article on central venous line insertion teaching: Embracing errors in simulation-based training</p> | <p>Module “Problem” discussion – come prepared” for debate (See this module’s page for problem text.)</p> <p>Mid-term</p> <p>Examination – will cover modules 1-8</p> |

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| 10 Nov 10 | Topics in Privacy and Security | <p>Journal Articles: (2)</p> <p>What caused the breach? An examination of use of information technology and health data breaches</p> <p>The changing privacy landscape in the era of big data.</p> <p>Encryption: Videos (about 30 minutes): Watch only first 2 – or 3.</p> | <p>Module “Problem” discussion – come prepared for debate (See this module’s page for problem text.)</p> <p>Quiz – Modules 9,10</p> |
| 11 Nov 17 | Advances in Interconnectedness – Home Monitoring for the Elderly | <p>Journal Articles: (2)</p> <p>Aging society and gerontechnology</p> <p>A systematic review of telehealth tools and interventions to support family caregivers.</p> | <p>Module “Problem” discussion – come prepared for debate (See this module’s page for problem text.)</p> <p>Tools for Healthcare Informatics Assignment Due: Nov 17(all four modules)</p> |
| 12 Nov 24 | Informatics and Public Health Surveillance | <p>Journal Articles: (3)</p> <p>Syndromic surveillance for influenza in the emergency department-A systematic review</p> <p>Ethical Challenges of Big Data in Public Health</p> <p>An overview of internet biosurveillance.</p> | |
| 13 | Windows into the Future | <p>Personal Genomics</p> <p>Risks of Nutrigenomics and Nutrigenetics?</p> | Project: Full Social Network |

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| Dec 1 | | What the Scientists Say | Survey Analysis Due: Dec 1 midnight Quiz – Modules 11,12,13 |
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Course Evaluation

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

| Assignment | Marks | % | Due Date |
|--|--------------|----------|--|
| Individual Project: Tools for Healthcare Informatics - four separate modules | 25 | 25 | November 19 (all 4 modules) |
| Group Project: Social Network Analysis Project | 25 | 25 | Social network diagram analysis due by October 15. Final report for this project due December 3. |
| Class and Online Debate Participation Final Examination | 10 | 10 | For each module, before the Thursday following. |
| Midterm Examination | 10 | 10 | During Module 9 |
| Six Quizzes @ 5 marks each | 30 | 30 | See Course Schedule |

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:

| %Grade | Grade |
|---------------|--------------|
| 90-100 | A+ |
| 85-89 | A |

| | |
|--------------|----|
| 80-84 | A- |
| 76-79 | B+ |
| 72-75 | B |
| 68-71 | B- |
| 64-67 | C+ |
| 60-63 | C |
| 55-59 | C- |
| 50-54 | D |
| 49 and below | F |

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>