COURSE OBJECTIVE: This is primarily an online course that reviews and discusses critical issues related to innovations in e-health, including the drivers for these innovations, the trends that are developing in the e-health field, some notable successes and failures of e-health to meet the expectations that might have been promised, and what might be done to improve the potential of e-health as a positive force for change in our healthcare system.

Thursday Evenings 7:00 to 10:00 pm

Dr. Norm Archer
Instructor
archer@mcmaster.ca
Office: TSH 601
Office Hours: before class 6:00 to 7:00 or by appointment
Tel: (905) 525-9140 x23944
Class Location: DSB A102

Course Website: http://avenue.mcmaster.ca

COURSE ELEMENTS

<table>
<thead>
<tr>
<th>Avenue:</th>
<th>Yes</th>
<th>Leadership:</th>
<th>Yes</th>
<th>IT skills:</th>
<th>Yes</th>
<th>Global view:</th>
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<tr>
<td>Participation:</td>
<td>Yes</td>
<td>Ethics:</td>
<td>Yes</td>
<td>Numeracy:</td>
<td>Yes</td>
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<td>Yes</td>
<td>Innovation:</td>
<td>Yes</td>
<td>Group work:</td>
<td>Yes</td>
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<td>Experiential:</td>
<td>Yes</td>
<td>Guest speaker(s):</td>
<td>Yes</td>
<td>Final Exam:</td>
<td>No</td>
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Course Description

This course may be attended either in person or (primarily) online. It reviews the latest innovations in eHealth, the trends in their use, how they are affecting the provision of healthcare, whether they are regarded by users as successes or failures, and the related reasons for these opinions. Learning will be through group presentations on topics that students have reviewed in detail, by class discussions of cases relevant to each topic, by presentations by visiting experts, and by developing, writing, and presenting term papers on eHealth topics of interest.
LEARNING OUTCOMES

Upon completion of this course, students will be able to complete the following key tasks:

- Explain the role that eHealth plays in the healthcare system, based on topics introduced during the course;
- Assess the prospects of eHealth innovations proposed in specific circumstances in the healthcare system;
- Define the capabilities needed to successfully develop and deploy a specific eHealth innovation;
- Formulate a plan that considers how to modify an organization’s capabilities in preparation for an eHealth innovation;
- Implement changes, as necessary, in order to position the organization in preparation for implementing an eHealth innovation in the organization.

REQUIRED COURSE MATERIALS AND READINGS

Avenue registration for course content, readings and case materials
- http://avenue.mcmaster.ca

Online access to the McMaster Library to search for journal articles or books relevant to the topics being reviewed in the course.

OPTIONAL COURSE MATERIALS AND READINGS

Open to student research of suitable journal publications and/or books.

EVALUATION

All students will be evaluated in the same manner, whether they attend class online or physically in class. Class learning is through online introductory instructor presentations, discussions of cases relevant to specific topics, student reviews, and presentations of topic material, and presentations by visiting speakers. Please see pages 8-11 for more details. Each class will feature a specific topic, and student groups will be organized such that each will volunteer to review material on one specific topic and present their reviews on the day assigned for that topic, based as much as possible on published literature reviews or published papers. Students may use videos to illustrate topic material but these are limited to five minutes maximum per presentation. Depending on the class size, individuals rather than teams may be assigned to present class material. Presentations should take approximately one hour, including discussion. Discussion contributions may be directly in-class (by those attending physically) or online (for those participating online). Reference sources are provided for each topic (see pages 11-13), but students should also search for additional sources of material upon which to base their discussions. Presenters are also asked to give their opinions and reasons about whether and why: a) the subject under discussion is an
innovation; b) it represents a trend; and c) its implementation has been a success or a failure. Each presentation should include a discussion of how well the topic subject integrates and works with other existing systems and with healthcare processes in general. Each presentation will be followed by a general class discussion of issues related to the topic, and students will receive a mark based on their contribution to class discussions. Some sessions will be enriched by invited speakers.

Students will also develop term papers on topics relevant to the course and present them during the last two weeks of the course, but these are NOT to be regarded by eHealth students as potential scholarly papers. Term paper topics are to be decided after discussion and agreement with the instructor. The deadline for deciding on a term paper topic is the third week of class, when an abstract of the proposed paper has been approved by the instructor. Term papers should include at least 20 pages (1.5 line spacing), and should include title page, abstract, table of contents, introduction, literature review, findings, discussion, and reference list, plus appendices as appropriate. Exceptions to this list may be allowed if discussed beforehand with the instructor.

Your final grade will be calculated as follows:

**Components and Weights**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Participation in class discussions</td>
<td>10%</td>
</tr>
<tr>
<td>Group class presentation on lecture topic</td>
<td>30%</td>
</tr>
<tr>
<td>Class presentation on term paper</td>
<td>25%</td>
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<tr>
<td>Written term paper</td>
<td>35%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
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**Grade Conversion**

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

<table>
<thead>
<tr>
<th>LETTER GRADE</th>
<th>PERCENT</th>
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<tbody>
<tr>
<td>A+</td>
<td>90 - 100</td>
</tr>
<tr>
<td>A</td>
<td>85 - 89</td>
</tr>
<tr>
<td>A-</td>
<td>80 - 84</td>
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<tr>
<td>B+</td>
<td>77 - 79</td>
</tr>
<tr>
<td>B</td>
<td>74 - 76</td>
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<tr>
<td>B-</td>
<td>70 – 73</td>
</tr>
<tr>
<td>F</td>
<td>00 - 69</td>
</tr>
</tbody>
</table>
Communication and Feedback

Students that are uncomfortable in directly approaching an instructor regarding a course concern may send a confidential and anonymous email to the respective Area Chair or Associate Dean:

http://www.degroote.mcmaster.ca/curr/emailchairs.aspx

Students who wish to correspond with instructors or TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student. Emails regarding course issues should NOT be sent to the Administrative Assistant.

Instructors are encouraged to conduct an informal course review with students by Week #4 to allow time for modifications in curriculum delivery. Instructors should provide evaluation feedback for at least 10% of the final grade to students prior to Week #8 in the term.

ACADEMIC DISHONESTY

It is the student’s responsibility to understand what constitutes academic dishonesty. Please refer to the University Senate Academic Integrity Policy at the following URL:

http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

This policy describes the responsibilities, procedures, and guidelines for students and faculty should a case of academic dishonesty arise. Academic dishonesty is defined as to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. Please refer to the policy for a list of examples. The policy also provides faculty with procedures to follow in cases of academic dishonesty as well as general guidelines for penalties. For further information related to the policy, please refer to the Office of Academic Integrity at:

http://www.mcmaster.ca/academicintegrity

Plagiarism detected in written material may be reported to those responsible for overseeing academic integrity. You may therefore wish to submit your written term paper to Turnitin.com or Grammarly to check for plagiarism before submitting it for marking. To see guidelines for the use of Turnitin.com or Grammarly, please go to:

http://www.mcmaster.ca/academicintegrity/turnitin/students/index.html

or (for Grammarly) to: https://library.mcmaster.ca/news/8839

Missed Mid-Term Examinations / Tests / Class Participation

Where students miss a regularly scheduled mid-term or class participation for legitimate reasons as determined by the eHealth Office or MBA Academic Services Office, the weight for that test/participation will be distributed across other evaluative components of the course at the
discretion of the instructor. Documentation explaining such an absence must be provided to the eHealth Office or MBA Academic Services Office within five (5) working days upon returning to school.

To document absences for health related reasons, please provide the Petition for Relief for MBA Missed Term Work and the McMaster University Student Health Certificate which can be found on the DeGroote website at http://mbastudent.degrote.mcmaster.ca/forms-and-applications/. Please do not use the online McMaster Student Absence Form as this is for Undergraduate students only. University policy states that a student may submit a maximum of three (3) medical certificates per year after which the student must meet with the Director of the program.

To document absences for reasons other than health related, please provide a Petition to the eHealth Office or the Petition for Relief for MBA Missed Term Work and documentation supporting the reason for the absence.

Students unable to write a mid-term at the posted exam time due to the following reasons: religious; work-related (for part-time students only); representing university at an academic or varsity athletic event; conflicts between two overlapping scheduled mid-term exams; or other extenuating circumstances, have the option of applying for special exam arrangements. Such requests must be made to the MBA Academic Services Office or (for eHealth students) the eHealth Program Office at least ten (10) working days before the scheduled exam along with acceptable documentation. Instructors cannot themselves allow students to unofficially write make-up exams/tests. Adjudication of the request must be handled by the MBA Academic Services Office or eHealth Program Office.

If a mid-term exam is missed without a valid reason, students will receive a grade of zero (0) for that component.

**Missed Final Examinations**

A student who misses a final examination without good reason will receive a mark of 0 on the examination.

All applications for deferred and special examination arrangements must be made to the MBA Academic Services Office or eHealth Program Office. Failure to meet the stated deadlines may result in the denial of these arrangements. Deferred examination privileges, if granted, must be satisfied during the examination period at the end of the following term. There will be one common sitting for all deferred exams.

Failure to write an approved deferred examination at the pre-scheduled time will result in a failure for that examination, except in the case of exceptional circumstances where documentation has been provided and approved. Upon approval, no credit will be given for the course, and the notation N.C. (no credit) will be placed on the student’s transcript. Students receiving no credit
for a required course must repeat the course. Optional or elective courses for which no credit is
given may be repeated or replaced with another course of equal credit value.

Requests for a second deferral or rescheduling of a deferred examination will not be considered.

Any student who is unable to write a final examination because of illness is required to submit the
Application for Deferred Final Examination and a statement from a doctor certifying illness on the
date of the examination. The Application for Deferred Final Examination and the McMaster
University Student Health Certificate can be found on the DeGroote website at
http://mbastudent.degroote.mcmaster.ca/forms-and-applications/ Please do not use the online
McMaster Student Absence Form as this is for Undergraduate students only. Students who write
examinations while ill will not be given special consideration after the fact.

In such cases, the request for a deferred examination privilege must be made in writing to the MBA
Academic Services Office of eHealth Program Office within five business days of the missed
examination.

Special examination arrangements may be made for students unable to write at the posted exam
time due to compelling reasons (for example religious, or for part-time students only, work-related
reasons):

- Students who have religious obligations which make it impossible to write examinations
  at the times posted are required to produce a letter from their religious leader stating that
  they are unable to be present owing to a religious obligation.
- Part-time students who have business commitments which make it impossible to write
  examinations at the times posted are required to produce a letter on company letterhead
  from the student’s immediate supervisor stating that they are unable to be present owing to
  a specific job commitment.

In such cases, applications must be made in writing to the MBA Academic Services Office or
eHealth Program Office at least ten business days before the scheduled examination date and
acceptable documentation must be supplied.

If a student is representing the University at an academic or athletic event and is available at an
overlapping scheduled time of the test/examination, the student may write the test/examination at
an approved location with an approved invigilator, as determined by the MBA Academic Services
Office or eHealth Program Office.

In such cases, the request for a deferred examination privilege must be made in writing to the MBA
Academic Services Office or eHealth Program Office within ten business days of the end of the
examination period.

Note: A fee of $50 will be charged for a deferred exam written on campus and a fee of $100 for
deferred exams written elsewhere. In cases where the student’s standing is in doubt, the Graduate
Admissions and Study Committee may require that the student with one or more deferred
examination privileges refrain from re-registering until the examination(s) have been cleared.
**STUDENT ACCESSIBILITY SERVICES**

Student Accessibility Services (SAS) offers various support services for students with disabilities. Students are required to inform SAS of accommodation needs for course work at the outset of term. Students must forward a copy of such SAS accommodation to the instructor normally, within the first three (3) weeks of classes by setting up an appointment with the instructor. If a student with a disability chooses NOT to take advantage of an SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. The SAS website is:

http://sas.mcmaster.ca

**POTENTIAL MODIFICATIONS TO THE COURSE**

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

**RESEARCH USING HUMAN SUBJECTS**

Research involving human participants is premised on a fundamental moral commitment to advancing human welfare, knowledge and understanding. As a research intensive institution, McMaster University shares this commitment in its promotion of responsible research. The fundamental imperative of research involving human participation is respect for human dignity and well-being. To this end, the University endorses the ethical principles cited in the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans:

http://www.pre.ethics.gc.ca

McMaster University has mandated its Research Ethics Boards to ensure that all research investigations involving human participants are in compliance with the Tri-Council Policy Statement. The University is committed, through its Research Ethics Boards, to assisting the research community in identifying and addressing ethical issues inherent in research, recognizing that all members of the University share a commitment to maintaining the highest possible standards in research involving humans.

If you are conducting original research, it is vital that you behave in an ethical manner. For example, everyone you speak to must be made aware of your reasons for eliciting their responses and consent to providing information. Furthermore, you must ensure everyone understands that participation is entirely voluntary. Please refer to the following website for more information about McMaster University’s research ethics guidelines:

http://www.mcmaster.ca/ors/ethics
Organizations that you are working with are likely to prefer that some information be treated as confidential. Ensure that you clarify the status of all information that you receive from your client. You **MUST** respect this request and cannot present this information in class or communicate it in any form, nor can you discuss it outside your group. Furthermore, you must continue to respect this confidentiality even after the course is over. If you plan to carry out research as part of this course that involves gathering and analyzing data from human subjects, please discuss this with your instructor well in advance of planning and implementing your study.

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### eHealth 745  eHealth Innovations and Trends  
**Winter 2017 Course Schedule**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>ASSIGNMENT</th>
<th>THIS WEEK’S READINGS &amp; TEAM PRESENTATIONS**</th>
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<tbody>
<tr>
<td>1</td>
<td>Thurs. Jan. 11</td>
<td>Class Outline, Schedule, Participation; Presentation topics; Lecture/Presentation: The Evolution of Technology and Medicine; Cases 1a-1d; Class Discussion</td>
<td>[1, 2]</td>
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<tr>
<td></td>
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<td>Case 1a: CRT Evolution [3]</td>
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<tr>
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<td></td>
<td></td>
<td>Case 1b: Ebola Epidemic</td>
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<tr>
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<td>Case 1c: Opioid Crisis</td>
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<td>Case 1d: Self-Managing Chronic Illness</td>
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<td>Thurs. Jan. 18</td>
<td>Lecture/Presentation: Advances in Telemedicine; Case 2; Class Discussion</td>
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<td>Case 2: [9]</td>
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<td>3</td>
<td>Thurs. Jan. 25</td>
<td>Lecture/Presentation: Advances in mHealth and Wearables; Case 3; Class Discussion</td>
<td>[10-14]</td>
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<td>Case 3: [15]</td>
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<tr>
<td>4</td>
<td>Thurs. Feb. 1</td>
<td>Invited Lecture by Dr. Reza Samavi: Prospects for Blockchain in Healthcare; Cases 4a and 4b; Class Discussion</td>
<td>Student Group Presentation: mHealth Applications; Class Discussion [16] (free download)</td>
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<td>Case 4a: [17]</td>
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<td>Maersk Supply Chain</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Case 4b: [18]</td>
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<tr>
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<td>Drug Traceability</td>
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<td></td>
<td>Date</td>
<td>Lecture/Presentation</td>
<td>Student Group Presentation</td>
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<td>5</td>
<td>Thurs. Feb. 8</td>
<td>Lecture/Presentation: Advances in Health Information Security and Privacy; Contemporary problems and solutions; Case 5; Class Discussion</td>
<td>Student Group Presentation: Blockchains in Healthcare; Class Discussion</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>[19-23]</td>
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<td></td>
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<td>Case 5: [24]</td>
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<tr>
<td>6</td>
<td>Thurs. Feb. 15</td>
<td>Lecture/Presentation: Advances in Cloud Computing and Big Data for Healthcare; Case 6; Class Discussion</td>
<td>Student Group Presentation: Information Privacy &amp; Security; Class Discussion</td>
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<td></td>
<td></td>
<td></td>
<td>[25-33]</td>
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<td>Case 6: [34]</td>
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<tr>
<td>7</td>
<td>Thurs. Mar. 1</td>
<td>Lecture/Presentation: Advances in the Internet of Things for Healthcare; Case 7; Class Discussion</td>
<td>Student Group Presentation: Cloud Computing for Healthcare; Class Discussion</td>
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<td></td>
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<td></td>
<td>[35-38]</td>
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<td></td>
<td>Case 7: [39]</td>
</tr>
<tr>
<td>8</td>
<td>Thurs. Mar 8</td>
<td>Lecture/Presentation: Artificial Intelligence in Healthcare; Case 8; Class Discussion</td>
<td>Student Group Presentation: Internet of Things for Healthcare; Class Discussion</td>
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<tr>
<td></td>
<td></td>
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<td>[40]</td>
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<td>Case 8: [41]</td>
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<tr>
<td>9</td>
<td>Thurs. Mar. 15</td>
<td>Invited Speaker Dr. Mehrdad Roham: Data Analytics &amp; Visualization in Healthcare; Case 9; Class Discussion</td>
<td>Student Group Presentation: Artificial Intelligence in Healthcare; Class Discussion</td>
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<tr>
<td></td>
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<td>[42-47]</td>
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<tr>
<td></td>
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<td></td>
<td>Case 9: [48]</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Resources</td>
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<tr>
<td>10. Thurs. Mar. 22</td>
<td>Lecture/Presentation: <strong>Introduction to Genomics; Cases 10a &amp; 10b; Class Discussion</strong></td>
<td><strong>Student Group Presentation: Data Analytics &amp; Visualization in Healthcare; Class Discussion</strong> [49, 50] Case 10a: Slides 36 &amp; 37 Case 10b: [51]</td>
<td></td>
</tr>
<tr>
<td>11. Thurs. Mar. 29</td>
<td><strong>Does eHealth Improve Healthcare Quality and/or Reduce Healthcare Costs? Case 11; Class Discussion to include: Where are the main opportunities for future advances in eHealth?</strong></td>
<td><strong>Student Group Presentation: Genomics Class Discussion</strong> [52-54], 49-51 Case 11: [55]</td>
<td></td>
</tr>
<tr>
<td>12. Thurs. Apr. 5</td>
<td><strong>Student Term Paper Presentations I; Class Discussions</strong></td>
<td></td>
<td></td>
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<tr>
<td>13. Thurs. Apr. 12</td>
<td><strong>Student Term Paper Presentations II; Class Discussions</strong></td>
<td></td>
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</tr>
</tbody>
</table>

**Class Schedule and Resources**

The class will be delivered both physically and in virtual mode, using the online system WebEx. It is generally the case that quality of class and instructor interaction is superior when you attend class physically, so this is the preferred avenue of attendance. Contact the instructor if you wish to participate in the class virtually through the Internet. You will be e-mailed information necessary to link online through this system. **Do not attempt to participate via cellphone because this results in poor quality audio that can disrupt the class. To participate verbally online you must acquire and use a headset,** since a normal microphone often results in unpleasant feedback sounds that disrupt the session. If this happens, your audio will be blocked by the instructor. Reasonable quality USB headsets (e.g. Logitech) are available from Staples, Future Shop, etc. in the price range of $30 to $40. Text chat is also supported by WebEx via keyboard input.

Recorded introductory lectures, presentations, and written cases related to each session, except for team presentations and invited speakers, will be available online in advance from the Avenue system. However, all other presentations will be recorded for future online access. Journal articles
and other material will be accessible for download from online journals and eBooks in the McMaster library or online from other sources. In three of the sessions your physical attendance is mandatory (except for special situations with the permission of the instructor): 1) During the first class of the term, 2) When your team is giving a presentation, and 3) When you are presenting your term paper in the second last or last class of the term. However, anyone who wishes to physically attend any of the other classes at the normal time is welcome to do so. The instructor will be in the classroom every week.

The class will be organized into teams during the first class. Each team will present on a topic that was introduced in the previous week by the instructor in the recorded lecture for that week (see the detailed schedule above). Class teams will be responsible for a total of eight presentations during the term, starting with Class 4. The team members responsible for a specific topic will come to class to present on their topic, starting at the beginning of the class, for approximately one hour, followed by a ten to fifteen minute discussion.

When there is a team presentation scheduled for a particular week, the class will begin with their presentation, which will build on the topic initiated by the recorded introductory lecture during the previous week. Note that discussion marks are weighted heavily, so everyone must participate through the discussions in order to achieve passing grades, with student participation recorded by the instructor each week. Please note that class attendance does not count as participation unless you actually participate in the discussions. All students are expected to attend each class either physically or virtually, and must review in advance the new topic introduced for that week, and be prepared to participate in the related case discussions which will follow the team presentation. The first discussion of the evening will follow directly after the team presentation. This is followed by a discussion of the case provided for that week, in addition to discussion about the recorded introductory lecture for the current week’s topic.

Note About References: You must view the online presentation of the lecture and read the case reference in advance each week, in preparation for class discussion of the case. However, you are not required to read all the references in this list. Most were used in the preparation of lecture materials. They are listed here for your convenience, so you can make use of them for background material in studying lectures and cases, or preparing presentations on specific topics.

References

5. COACH, Canadian Telehealth Report


9. NORC, Patient provider telehealth network: Using telehealth to improve chronic disease management


18. Petre, A. Blockchain use cases in healthcare: Drug traceability


20. Avila, J. and S. Marshall, Your medical records may not be private


22. Ponemon_Institute, Sixth annual benchmark study on privacy & security of healthcare data (U.S. only). 2016, Ponemon Institute: Traverse City MI USA.


30. Selanikio, J., The surprising seeds of a big-data revolution in healthcare [https://www.youtube.com/watch?v=Mb8x6vLcggc](https://www.youtube.com/watch?v=Mb8x6vLcggc), in TED Presentation. 2013, TED.


32. Vuong, V., Hadoop in healthcare, in eHealth 745 eHealth Innovations and Trends Term Paper. 2015, McMaster University: Hamilton, Canada.


