

**eHealth 757**  
**Modern Software Technology for eHealth**  
**Fall 2022 Course Outline**

**MSc eHealth**  
**McMaster University**

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***INSTRUCTOR AND CONTACT INFORMATION***

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**Dr. Vincent Maccio**

Instructor

[macciiov@mcmaster.ca](mailto:macciiov@mcmaster.ca)

Office: ITB 219

Office Hours: Friday 2:30-3:20

**Student TA**

Akash Natvarlal Patel: [patea186@mcmaster.ca](mailto:patea186@mcmaster.ca)

**Course website:** <http://www.avenue.mcmaster.ca>

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***COURSE ELEMENTS***

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Credit Value: 3	Leadership: Yes	IT skills: Yes	Global view: Yes
Avenue: Yes	Ethics: No	Numeracy: Yes	Written skills: Yes
Participation: No	Innovation: Yes	Group work: Yes	Oral skills: Yes
Evidence-based: No	Experiential: Yes	Final Exam: No	Guest speaker(s): No

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***COURSE DESCRIPTION***

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This course will cover the topics: technical applications in the world of eHealth, software development life cycles, software requirement specifications, UML, privacy and security, interoperability, and standards. A student without a strong technical background will have a broad overview of computer science undergraduate topics by the end of this course. We will examine these topics through an eHealth lens and apply them to two projects throughout the course.

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## ***LEARNING OUTCOMES***

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

- Understand the need for standards and the impact they have on software interoperability.
  - Write functional and non-functional requirements
  - Create UML diagrams to document software design
  - Orally communicate technical information to a technically-heterogenous audience
  - Understand legacy and modern standards used in industry (HL7, FHIR, etc.)
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## ***REQUIRED COURSE MATERIALS AND READINGS***

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Avenue registration for course content, readings, and case materials

- <http://avenue.mcmaster.ca>

Microsoft Teams registration for course content.

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## ***OPTIONAL COURSE MATERIALS AND READINGS***

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Principles of Health Interoperability: SNOMED CT, HL7 and FHIR, Tim Benson

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## ***EVALUATION***

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All work will be evaluated on an individual basis except in certain cases where group work is expected. In these cases, group members will share the same grade adjusted by peer evaluation. All due dates, i.e., “week 5”, “weeks 8-10” etc., are estimations and could change due to lecture pace, class size, etc. Your final grade will be calculated as follows:

### Components and Weights

<b>Assignment 1 (week 5)</b>	Lecture Material (individual)	10%
<b>Assignment 2 (week 8)</b>	Lecture Material (individual)	10%
<b>Independent Study Presentation (weeks 8-10)</b>	10-12 mins (individual)	20%
<b>Independent Study Report (week 10)</b>	Summary and Reflection (individual)	15%
<b>Group Project Presentation (weeks 11-12)</b>	25-30 mins (group)	15%
<b>Group Project Report (end of term)</b>	Several Assessments (individual)	30%
<b>Total</b>		<b>100%</b>

### 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:

LETTER GRADE	PERCENT	POINTS
A+	90-100	12
A	85-89	11
A-	80-84	10
B+	77-79	9
B	73-76	8
B-	70-72	7
F	00-69	0

## Course Deliverables

### **Assignment #1**

This assignment is worth **10%** of your final grade and will be marked individually. It will focus on topics covered in the first 4 weeks of lecture.

### **Assignment #2**

This assignment is worth **10%** of your final grade and will be marked individually. It will focus on topics covered in the first 5-7 weeks of lecture.

### **Independent Study Presentation and Report**

This presentation and report are worth **15%** and **20%** respectively. Many of you do not have a strong technical background. However, you are all (at least somewhat) interested in technology. This independent study is a chance for you to expand your knowledge base and get grade credit for doing so. An accompanying document will be posted on Avenue at the beginning of this course. Please read this document and begin brainstorming potential topics of interest.

### **Group Project Presentation and Report**

This presentation and report are worth **15%** and **30%**, respectively. There will be three separate deliverables for the group report:

1. Proposal worth **5%**
2. Project update worth **5%**
3. Final report worth **20%**

In groups of 5-6 you will identify an aspect of healthcare which can be improved by technology. This technology will have a significant software component. You will fully specify this software by providing a software requirement specification (SRS). An accompanying document will be posted on Avenue at the beginning of this course. Please read this document. You will be responsible for forming your own groups. I will be creating a channel in Teams for you to reach out to your peers.

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## **COURSE DELIVERY AND SCHEDULE**

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To match the delivery of other eHealth and MBA courses:

**LECTURES WILL BEGIN THE WEEK OF SEPTEMBER 12<sup>TH</sup>.**

Lectures will persist throughout reading week.

Live lectures

Week	Topic
1	Introduction and discussion of interoperability. Software Development Life-cycle
2	Software development lifecycle. Software requirements.
3	More requirements, UML – Use case diagrams
4	UML sequence diagrams, state diagrams.
5	OO design, class diagrams
6	Standards, HL71-3, FHIR, Machine Learning
7	Privacy and Security. Encryption schemes, passwords, and traditional “attacks”
8	Independent study presentations
9	Independent study presentations
10	Independent study presentations
11	Independent study/Group project presentations
12	Group project presentations

### **COMMUNICATION AND FEEDBACK**

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**

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at:

[www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity)

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations

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### ***AUTHENTICITY/PLAGIARISM DETECTION***

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**Some courses may** use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software.

**All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

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### ***COURSES WITH AN ON-LINE ELEMENT***

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**Some courses may** use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course.

The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

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### ***ON-LINE PROCTORING***

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**Some courses may** use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

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## ***CONDUCT EXPECTATIONS***

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As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the “Code”). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

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## ***MISSED ACADEMIC WORK***

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### ***Missed Examinations / Tests / Class Participation***

Students can apply for relief of missed term work if they have or are going to miss an evaluated portion of their course. Please contact the Program Administrator for more information.

Students can request relief for:

- Health-related or extenuating circumstances
- Work-related commitments (for part-time students only)
- Representing the University at an academic or varsity event
- Religious obligations
- Conflicts between two (or more) overlapping scheduled mid-term exams

### ***Requesting Relief for Missed Term Work***

If a portion of your term work is missed for legitimate reasons, as determined by Program Administrator, the weight for that missed term work will be redistributed across the other assignments and exams of the course. For missed work, forms and supporting documentation must be submitted to Program Administrator within five (5) business days of missing the work or mid-term exam.

### ***Requesting Relief for Term Work in Advance***

If evaluated term work is missed, students can request for relief/special arrangement in advance. Supporting documentation must be submitted to the Program Administrator at least ten (10) working days before the mid-term exam, test, assignment, etc.

The program administrator will provide the required forms to the student. Please complete the Petition for Missed Term Work form in addition to:

- For medical reasons the McMaster University Student Health Certificate and for extenuating circumstances, appropriate documentation is required.
- Due to a business commitment (for part-time students only), have your immediate supervisor provide you with a letter on company letterhead stating that you are unable to be present due to a specific job commitment.
- For varsity reasons, have a designated University official provide a letter on university letterhead; or
- For religious reasons, have your religious leader provide a letter stating that you are unable to be present due to a religious obligation.

In all cases, the request must be handled by The Program Administrator. The appropriate distribution of re-weighting term work will be determined by the instructor. Submitting a request does not guarantee approval or special consideration.

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### ***ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES***

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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>

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### ***RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)***

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Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also



contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

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### ***COPYRIGHT AND RECORDING***

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Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

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### ***POTENTIAL MODIFICATION TO THE COURSE***

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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.

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### ***RESEARCH USING HUMAN SUBJECTS***

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#### ***ONLY IF APPLICABLE***

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://reo.mcmaster.ca/>

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.

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### ***ACKNOWLEDGEMENT OF COURSE POLICIES***

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Your registration and continuous participation (e.g. on A2L, in the classroom, etc.) to the various learning activities of eHealth 757 will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on A2L. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.