

OMSCS 6440 - Detailed Course Structure

This document goes over all the details about the three main parts of the course and will address many of the questions you might have. Please go through the entire document.

Grading:

- Quizzes - 30%
- Project - 50%
- Activities - 20%

Quizzes:

- There will be 5 quizzes with a time limit of 1 hour each
- Each quiz will cover lessons from the MOOC
- Quizzes 1, 2, and 3 will have 20 multiple choice questions
- Quizzes 4 and 5 will have 10 multiple choice questions
- There is no negative marking and only 1 correct answer
- Each quiz will have a max score of 20 points
- Each quiz will be worth 6% of your total course grade

Quiz	Lessons Covered
1	1, 2
2	3, 4
3	5 (A & B) , 6
4	7, 8
5	9, 10

Activities:

The activities and project part of the course are structured around FHIR (Fast Healthcare Interoperability Resources).

A detailed description can be found here:

- FHIR Specification - <https://www.hl7.org/fhir/http.html>
- FHIR Resources - <http://hl7.org/fhir/2015May/resourcelist.html>

The Georgia Tech FHIR Server can be found here -

<http://polaris.i3l.gatech.edu:8080/gt-fhir-webapp/>

You will have access to a synthetic client database that mimics real healthcare data through the FHIR Server. The course project involves utilizing the data from FHIR - the activities are designed to get you up to speed on the usage of FHIR and familiarize yourselves with the FHIR server.

The FHIR Activities:

- These will be a set of activities posted as assignments via TSquare
- There will be two sections
 - Section 1: Fill-in-the-blank questions based on the results obtained from queries to the GT FHIR servers
 - Section 2: Will involve creating and uploading new patient bundles of your own

Project:

The course involves a semester long project worth 50% of your course grade.

Your team should identify a real-world healthcare problem or opportunity and implement a solution to address the opportunity or solve the problem. As in the real-world, complex problems are best solved by teams. Establishing a well-rounded and cohesive team will be important to ensure the identified problem and solution properly explore your chosen domain. Establishing good team communication and delegation practices will help your team succeed. While it is understood that not all solutions can be implemented in such a short timeframe, teams are encouraged to explore the best representation of your solution while utilizing the FHIR resources you learn about through this course. You can “mock up” components of your solution you don’t have time, skills or technical means to implement but you must clearly indicate that in your final submission. The creativity you show will count toward your grade and, of course, the degree to which you’ve implemented your solution will also be a factor.

This will be done in teams of 4-6 people, and will involve 4 major milestones. Students will be allowed to choose their own team mates and the project will fall under one of the following four domains:

- Patient Facing Tools
- EHR Enhancements
- Population Health
- Clinical Decision Support

Knowledge of web programming is required by at least some members of each team to do the team project.

Mentor TAs: Each domain is assigned to a Mentor TA. Your Mentor TA has successfully taken this course. They will have the primary responsibility for your project grade which is half of your overall grade, so make sure you're keeping them in the loop as you proceed!

Mentor TAs will establish a forum for that domain on Piazza and each team will have its own sub-area within that forum. You will use this to communicate with your Mentor TA and, if you chose, other teams working in your domain. Teams are welcome to use whatever collaboration technologies (Hangouts, etc.) they wish and have complete freedom to choose their own language(s), technology stack and environment.

The project is worth 100 points.

A general overview of the four milestones and two ungraded "checkpoints":

- Team formation
- Domain selection - All teams will submit an idea for each of the four domains, in order of preference
- Milestone 1 - Idea introduction (10 points)
- Milestone 2 - Technical details, feature plan (25 points)
- Milestone 3 - Progress, Intermediate Feedback, and Implementation (25 points)
- Milestone 4 - Final Demo (40 points)

Project Grading

Your project will be graded on:

- Research – Did the team thoroughly investigate the problem and interview prospective end users to understand their requirements? Did the team identify industry problems or gaps in current solutions?
- Functionality – How well did the final app work and did it fulfill the design proposed by the team? Does it fully meet user requirements?
- Usability – Could a user easily understand the app? Was good documentation/help/tutorial provided?
- Design – Was the user interface attractive, friendly and appealing?
- Innovation – Did the team develop and implement new ideas that aren't already in common use? Did they bring ideas from other domains into the one they explored?
- Final Report – is the final video interesting, creative and did it clearly explain what the team determined to be the problem, their solution and how they implemented it?

The Project Domains

EHR Enhancements : As you'll learn in this class, current EHRs are often criticized by physicians for being an inefficient means of data collection and clinical documentation; for not providing useful visual analytics of the health data they contain; for not supporting optimal workflow and process and

for not incorporating newer elements of care delivery such as patient-generated data, population health and analytics. Many hope that a “universal app platform” based on FHIR will foster innovative solutions to these problems much sooner than could be done by major redesign of existing EHRs.

Focus should be on

1. efficient data collection, clinical documentation
2. visual analytics of health data
3. optimal workflow and processes
4. newer care delivery - patient-generated data, population health and analytics
5. also research/interview with **health care providers**

Examples:

- <https://gallery.smarthealthit.org/apps/17>
- <https://gallery.smarthealthit.org/apps/18>

Patient Facing Tools : As you'll learn in this class, chronic diseases, particularly where patients have more than one of them, drive most health care costs. Moreover, successful treatment of them requires a well-coordinated, more continuous and ultimately more patient-centered approach to care. Most experts agree that new mobile, wearable or unobtrusive technologies in the patient's environment offer a hope of collecting data of value to patients in managing their condition and to their providers in being more proactive in their care. Here there is an opportunity for FHIR apps that can provide education, advice and even decision support to patients personalized through the lens of their own medical data.

Focus should be on:

1. collecting data using mobile, wearable or unobtrusive technologies
2. value to patient for managing their conditions
3. value to provider for being more proactive
4. provide: education, advice, decision support using patient's own data
5. also research/interview with **patients**

Examples:

- <https://gallery.smarthealthit.org/apps/66>
- <https://gallery.smarthealthit.org/apps/21>

Clinical Decision Support : As you'll learn in this class, medical errors are far more common than they should be and patients on average only received 50% of what is felt to be optimal care for their chronic diseases. Busy physicians don't have time to thoroughly review patient histories or interview patients themselves. Moreover, medical knowledge is growing at a rate that makes it almost impossible for physicians to keep up. Many feel that FHIR apps, combined

with analytics engines, could help physicians by providing timely advice as they are making care decisions.

Focus should be on:

1. medical errors are more common than ideal -- busy physicians
2. growing medical knowledge is a challenge for physicians to keep up
3. combine with analytics engines, for timely advice to physicians
4. also research/interview with **physicians**

Examples:

- <https://gallery.smarthealthit.org/apps/59>
- <https://gallery.smarthealthit.org/apps/55>

Public/Population Health : While the “one patient at a time” scenario we’re all familiar with dominates our attention, it is clear that the overall increase in life expectancy we’ve seen over the past century is due far more to improved public health (primarily through improved sanitation and vaccinations) than it is to medical practice. Public health is poised to use modern informatics tools for surveillance (keeping track of disease patterns, including infectious disease outbreaks and possible bioterrorism, in the entire population) and for managing registries of patients with conditions (such as cancer) that are important to track for analysis so we can expand our knowledge of them. It’s also clear that “one patient at a time” done only while the patient is in the provider’s office is not an effective approach to chronic disease management. Population health is a much newer idea that encompasses using informatics tools to monitor the entire practice so that it can be far more proactive in reaching out to patients who are heading toward trouble and expensive care while there is still time to bring them in or reach out to them to reverse things. Both of these domains are ripe for innovation through visual and other forms of analytics. Teams working on Public/Population health apps will explore one or more of these themes (or others they uncover through their research and/or interviews with public health professionals or professionals, such as care coordinators in a patient-centered medical home, engaged in population health).

Focus should be on:

1. “one patient at a time” is ineffective for public health management - reach the root cause(s)
2. population health is a new idea - proactive - before it happens
3. modern HIT to track disease pattern, outbreaks, bioterrorism etc.
4. registries of patients with conditions
5. visual and other form of analytics
6. research/interviews with **public health professionals** - care coordinators in a patient-centered medical home, engaged in population health etc.

