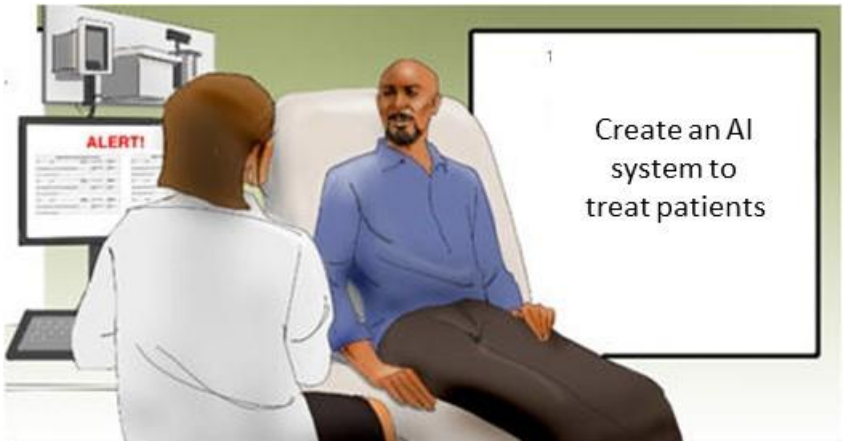
SYLLABUS HAP – 464

SPRING 2024

Course number and Course title: Class schedule: Mode of Instruction:	**HAP 464** **ELECTRONIC HEALTH RECORD CONFIGURATION AND DATA ANALYSIS** **Time: 7:20 PM – 10:00 PM on Wednesday.** **Online (Blackboard Collaborate Ultra)** Attendance in synchronous sessions is required and part of your grade.
Course Placement:	This course requires a prior course in standard query language.
Instructor:	Vladimir Cardenas, MBA, vcarden@gmu.edu Farrokh Alemi, PhD, falemi@gmu.edu Office Hours by appointment only
Course Description:	Focuses on analysis of data from electronic health records. Includes instruction on preparation of data including (a) removing inaccurate information, (b) organizing the timing of events/variables, (c) summarizing time-based variables. Students focus on accurate measurement of patient's prognosis and response to treatment. SQL and Python are used to create Multi-morbidity indices. Students must complete a literature review, describe methods used, present results, and discuss findings. 
Course Objectives:	**Methods Objectives** 1. Structure a problem so that quantitative analysis can assist 2. Obtain relevant data

	3. Complete a comprehensive review of previous studies of the same problem 4. Analyze massive data a. Clean data by removing out of range values b. Apply a rule for how missing data will be examined c. Check assumptions of the method of analysis d. Specify the time sequence for measuring covariates, treatment, and outcome. e. Select appropriate method of data analysis and removal of confounding in the data 5. Visually present complex multivariate data 6. Interpret quantitative findings 7. Describe limitations of the quantitative data 8. Present data to audiences not familiar with the methods used 9. Prepare multi-media reports of findings **Content specific objectives are**: 1. Measure prognosis of patients a. Charleston Index and its variants b. Multi-morbidity index 2. Measure impact of rare diseases on prognosis 3. Measure presence of EHR-based patient safety problems
Required Textbook:	This course uses an open textbook. Required reading are posted to the course web pages. The course page is http://openonlinecourses.com/464/default.asp Chapters from the following book is suggested reading: Big Data in Healthcare: Statistical Analysis of the Electronic Health Record 1st Edition
Course Requirements:	To benefit from this course students, need to have a prior course in use of Standard Query Language (SQL) and Python. Computer requirements This is an online and you are expected to access content through the internet. You will need: - Computer (PC or Mac) - Internet connection. - Windows computer is required to run Microsoft SQL Server. - Standard Query Language software for analysis of large data. - Python version 3 or higher for data analysis and programming of AI processes - Jupyter Notebook - All of Us Registration (https://www.researchallofus.org/register/) – Initial $300 is

	included with the registration, any additional charges need to be shouldered by the student
Teaching Methods:	Learn one, do one, teach one. Students learn better when they do projects and teach the concepts covered in the lectures. The course uses class time to provide hands-on experience with the assignments. **Prior Class:** 1. Peer-teachers meet with the instructor one-on-one. 2. Peer-teachers complete the assignment before class and get approval to proceed. 3. Before class, peer-teachers email to the entire class their suggested way to address the assignment. **During class:** 1. Attendance is required. If you cannot attend, you have to come up with a plan to help another student in class complete the assignment and report that you have helped him/her. 2. After a brief lecture from the instructor, students meet in small groups to work on an assignment. Peer teachers are randomly assigned to work with a subset of the class. 3. In small group, one person **must share their screen,** even for trivial steps such as finding the data, downloading the data and so on. Other people in the group are expected to help. 4. Students are expected to collaborate with each other on completing the assignment. 5. **Peer teachers grade students assigned to them using pass/fail grades.** Students receive passing grade if they get same answer as the instructor. Peer teacher are graded based on how many of their teammates complete the work on time.
Teamwork	Students are encouraged to work together, to help each other find errors, to help code, but all students are required to submit separate assignments including separate code for the analysis and interpretation of the data. Students first submit to the peer teacher and with the peer teacher's approval submit completed and corrected work to Blackboard.
Deliverables	**Weekly assignments:** - Each week, assignments are required to be uploaded to Blackboard - All assignments are done individually, with help from others. - Each assignment will be submitted with a one-page cover page. On this page, you will provide the peer-teachers evaluation of your work.

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<tr><td></td><td>Teach One:
- Students select four assignments they wish to teach.
- You are asked to complete the teach one assignment one week ahead of time, get approval from the instructor that it is done correctly, and then help students during class.

Exams/Projects:
- There are no exams
- There are two projects graded on pass/fail.

Presentations:
- Students required to publish to the web the presentations they use to teach sections of the course</td></tr>
<tr><td>Evaluation and Grading:</td><td><table><tr><th>Assignment</th><th>Percent of Grade</th></tr><tr><td>Semester Project</td><td>50%</td></tr><tr><td>Teach One</td><td>25% (peer grade)</td></tr><tr><td>Assignments</td><td>25%</td></tr><tr><td>Midterm</td><td>0%</td></tr><tr><td>Final</td><td>0%</td></tr></table>
Unexcused failure to attend synchronous sessions will result in loss of 20% of Teach One grade which is equivalent to 3% of the final grade</td></tr>
<tr><td>Grading Scale:</td><td><table><tr><th>Score</th><th>Letter Grade</th></tr><tr><td>96+</td><td>A</td></tr><tr><td>90-95</td><td>A-</td></tr><tr><td>86-89</td><td>B+</td></tr><tr><td>74-85</td><td>B</td></tr><tr><td>70-74</td><td>C</td></tr><tr><td>70 -</td><td>F</td></tr></table></td></tr>
<tr><td>Academic Integrity:</td><td>The projects in this course are collaborative effort. It is not OK to copy code from others doing same project. There must be clear evidence that you have developed the full code by yourself, although you can rely on prototypes set by others. You are responsible for the entire work. The presentation of the code must also be exclusively done by you, without copying presentation of others.</td></tr>
<tr><td>Individuals with Disabilities:</td><td>The Office of Disability Services (ODS) collaborates with students with documented disabilities and faculty to provide reasonable accommodations, auxiliary aids, and support services that are individualized and based upon medical documentation, functional limitations, and a collaborative assessment of needs. In order to</td></tr>
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	receive accommodations, students must complete the following process: http://ods.gmu.edu/students/services.php
E-mail Policy:	Mason uses electronic mail to provide official information to students. Examples include notices from the library, notices about academic standing, financial aid information, class materials, assignments, questions, and instructor feedback. Students are responsible for the content of university communication sent to their Mason e-mail account and are required to activate that account and check it regularly. Students are also expected to maintain an active and accurate mailing address in order to receive communications sent through the United States Postal Service. (Official Communication with Students https://catalog.gmu.edu/policies/student-rights-responsibilities/#text)

COURSE SCHEDULE	
Weeks	Topics
1 (Jan 17)	Introduction, sign up for (1) All of Us, (2) ChatGPT, (3) Teach One
2 (Jan 24)	Deadline for Sign Up for All of US
3 (Jan 31)	Create the database in All of US
4 (Feb 7)	Preparing the Dataset Part 1
5 (Feb 14)	Preparing the Dataset Part 2
6 (Feb 21)	Preparing the Dataset Part 3
7 (Feb 28)	Data Cleaning for Likelihood Ratio Calculations
8 (Mar 6)	Spring Break
9 (Mar 13)	Calculating Likelihood Ratios
10 (Mar 20)	Understanding the Race Neutral Model
11 (Mar 27)	Updating Dataset for Prediction
12 (Apr 3)	Predicting Response to Antidepressant
13 (Apr 10)	Testing Race Specific Models
14 (Apr 17)	Project Presentations Day 1
15 (Apr 24)	Project Presentations Day 2
16 (Apr 28)	Project Submission Deadline