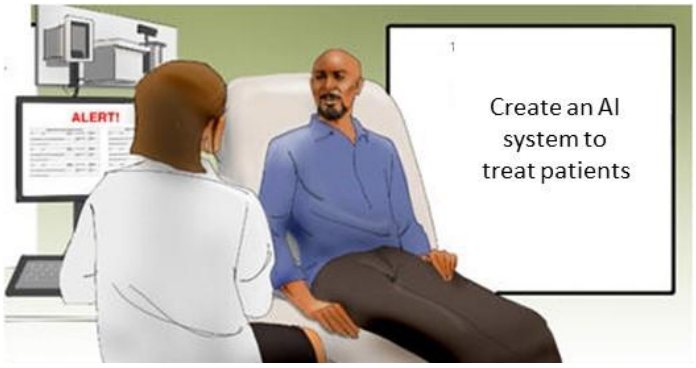
SYLLABUS HAP – 464

SPRING 2026

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 (Zoom)** Attendance in synchronous sessions is required and part of your grade. **<u>Zoom Details:</u>** Join Zoom Meeting https://gmu.zoom.us/j/91290125392?pwd=UacS4eolruedWK2gSHHqH03fbypGwa.1&from=addon Meeting ID: 912 9012 5392 Passcode: 807203 One tap mobile +12678310333,,91290125392#,,,,*807203# US (Philadelphia) +13017158592,,91290125392#,,,,*807203# US (Washington DC) Dial by your location +1 267 831 0333 US (Philadelphia) +1 301 715 8592 US (Washington DC) Meeting ID: 912 9012 5392 Passcode: 807203 Find your local number: https://gmu.zoom.us/u/aerZL7TTU8
Course Placement:	This course requires a prior course in Python Programming (HAP 318 Introduction to IT Methods for Healthcare) and SQL (HAP 361 Health Databases).
Instructor:	Vladimir Cardenas, MBA, MSHI - vcarden@gmu.edu Office Hours: By appointment only <u>Teaching Assistant:</u> Adnan Esilan - aesilan@gmu.edu Office Hours: By appointment only

Course Description:	Focuses on analysis of data from electronic health records (EHR). 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. Python and SQL are used to for data processing and analysis. 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. Interpret quantitative findings.
	6. Describe limitations of the quantitative data.
	7. Present data to audiences not familiar with the methods used.
	8. Prepare multi-media reports of findings.
	
	Content specific objectives are:
	
	1. Measure prognosis of patients.
	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 is posted to the course web pages. The course page is http://openonlinecourses.com/464/default.html Chapters from the following book is suggested reading: Big Data in Healthcare: Statistical Analysis of the Electronic Health Record 1st Edition
Course Requirements:	**All of Us Registration** (https://www.researchallofus.org/register/) - Access to All of Us data is critical to success in the course. Assignments and projects all need All of Us access. - Initial $300 credit is included with the registration; any additional charges need to be shouldered by the student. **Technologies:** - To benefit from this course students, need to have a prior course in use of **Standard Query Language (SQL)** and **Python**. - Familiarity with Jupyter Notebook and the Pandas Python Library are also required. **Computer requirements** The course contents and data platform are online, and you are expected to access content through the internet. You will need: - Computer (PC or Mac) - Internet connection. - Standard Query Language software for analysis of large data. - Python version 3 or higher for data analysis and programming of AI processes - Jupyter Notebook

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. Peer teachers record a video presentation of how to do the assignment. 4. Before class, peer teachers post their video presentations in Canvas. **During class:** 1. Attendance is required. If you cannot attend, you must produce 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 groups, 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 help students assigned to them complete the assignments.** Students receive a passing grade if they get the same answer as the instructor or peer teacher. Peer teachers 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 Canvas.

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<td>Deliverables</td>
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Attendance and participation:
- Students required to attend the class and participate in discussions and small groups.

Weekly assignments:
- Each week, assignments are required to be uploaded to Canvas.
- 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-teacher's evaluation of your work. Specifically, an email from your peer-teacher that says they have checked your work and that you can submit it.

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

Exams/Projects:
- There are no exams.
- There is a semester project graded on pass/fail.

Presentations:
- Students required to publish on the web (Canvas) the presentations they use to teach sections of the course.
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<td>Evaluation and Grading:</td>
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<tr><th>Assignment</th><th>Percent of Grade</th></tr>
<tr><td>Semester Project</td><td>45%</td></tr>
<tr><td>Teach One</td><td>25% (peer grade)</td></tr>
<tr><td>Assignments</td><td>25%</td></tr>
<tr><td>Participation</td><td>5%</td></tr>
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- Late submission will result in a 20% reduction in the grade for the submission and an additional 5% reduction for each week late.
- Unexcused failure to attend synchronous sessions will result in loss of 20% of Teach One grade which is equivalent to 5% of the final grade.
- Students are encouraged to use artificial intelligence (AI) software but should declare its use, including, which software was used, how and where it was used. Failure to do so will result in a 30% reduction in the submission grade.
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Grading Scale:	**Score** **Letter Grade** 96+ A 90-95 A- 86-89 B+ 74-85 B 70-74 C 70 - F
Academic Integrity:	The project in this course is a collaborative effort. **It is not OK to copy** code from others doing the 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.
Individuals with Disabilities:	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 receive accommodations, students must complete the following process: http://ods.gmu.edu/students/services.php
Course Expectations:	• **Log-in Frequency:** Students must actively check the course Canvas site and their GMU email for communications from the instructor, class discussions, and/or access to course materials at least 2 times per week. • **Participation:** Students are expected to actively engage in all course activities throughout the semester, which includes viewing all course materials, completing course activities and assignments, and participating in course discussions and group interactions. Under no circumstances, may students participate in online class sessions (either by phone or Internet) while operating motor vehicles. Further, as expected in a face-to-face class meeting, such online participation requires undivided attention to course content and communication. • **Technical Competence:** Students are expected to demonstrate competence in the use of all course technology. Students who are struggling with technical components of the course are expected to seek assistance from the instructor and/or College or University technical services. • **Technical Issues:** Students should anticipate some technical difficulties during the semester and should, therefore, budget their time accordingly. Late work will not be accepted based on individual technical issues.

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 21)	• Introduction and Syllabus • Sign up for (1) Project Topic and (2) Teach One • All of Us Registration follow-up
2 (Jan 28)	• Lecture: Project Overview • Lab: All of Us Registration
3 (Feb 4)	• Lecture: Create the database in All of US • Lab: All of Us Registration • Deadline: for Sign Up for All of US
4 (Feb 11)	• Lecture: Preparing the Dataset Part 1 • Lab: Create the database in All of US
5 (Feb 18)	• Lecture: Preparing the Dataset Part 2 • Lab: Preparing the Dataset Part 1 • Deadline: Create the database in All of US Assignment
6 (Feb 25)	• Lecture: Preparing the Dataset Part 3 • Lab: Preparing the Dataset Part 2 • Deadline: Preparing the Dataset Part 1 Assignment
7 (Mar 4)	• Lecture: Review of Project Progress • Lab: Preparing the Dataset Part 3 • Deadline: Preparing the Dataset Part 2 Assignment
8 (Mar 11)	• No Classes (Spring Break)
9 (Mar 18)	• Lecture: Data Cleaning for Likelihood Ratio Calculations • Deadline: Preparing the Dataset Part 3 Assignment
10 (Mar 25)	• Lecture: Calculating Likelihood Ratios using SQL • Lab: Data Cleaning for Likelihood Ratio Calculations
11 (Apr 1)	• Lecture: Predicting Response to Antidepressant • Lab: Calculating Likelihood Ratios using SQL • Deadline: Data Cleaning for Likelihood Ratio Calculations
12 (Apr 8)	• Lecture: Interpreting Our Results • Lab: Predicting Response to Antidepressant • Deadline: Calculating Likelihood Ratios using SQL Assignment
13 (Apr 15)	• Lecture: Finalizing Project Reports • Lab: Interpreting Our Results • Deadline: Predicting Response to Antidepressant Assignment
14 (Apr 22)	• Student Presentations: Project Presentations Day 1 • Deadline: Interpreting Our Results Assignment
15 (Apr 29)	• Student Presentations: Project Presentations Day 2
16 (May 6)	• Deadline: Project Paper Submission • No Classes