**SYLLABUS HAP – 464**

SPRING 2022

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| Course number and  Course title:  Class schedule: | **HAP 464**  **ELECTRONIC HEALTH RECORD CONFIGURATION AND DATA ANALYSIS**  **Time: 7:20 PM – 10:00 PM on Wednesday.**  Attendance in synchronous sessions is required and part of your grade. |
| Course Placement: | This course requires a prior course in standard query language. |
| Instructor: | Farrokh Alemi, PhD,      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. SQL is used to create Charlson and 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    1. Clean data by removing out of range values    2. Apply a rule for how missing data will be examined    3. Check assumptions of the method of analysis    4. Specify the time sequence for measuring covariates, treatment, and outcome.    5. 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    1. Charleston Index and its variants    2. 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>  The following book is suggested reading: [Big Data in Healthcare: Statistical Analysis of the Electronic Health Record 1st Edition](https://www.amazon.com/Big-Data-Healthcare-Statistical-Electronic-ebook/dp/B083JVRQS6) |
| Course Requirements: | To benefit from this course students, need to have a prior course in use of Standard Query Language.  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. |
| 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. 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. **You are graded on how much you help others.** At end of class you are asked who helped you, and the people most named as helpful get higher grades. |
| 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. |
| 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 a terse summary of your homework, one line per problem where you describe your attempt at the problem and whether this matched the known response.   **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 that it is done correctly, and then help students during class.   **Exams:**   * There is a midterm and final exam * Exams are done without help from others. * Exams are open book * At discretion of the instructor, you can be waived from taking the final, if you have excellent grades and you wish to do an approved project.   **Presentation:**   * Students required to publish to the web two presentations (one per project) * Students are required to comment on the work of three colleagues using a rubric provided by the instructor |
| Evaluation and Grading: | |  |  | | --- | --- | | **Assignment** | **Percent of Grade** | | Project 1 | 10% | | Project 2 | 10% | | Teach One | 20% (peer grade) | | Midterm | 30% | | Final | 30% |   Unexcused failure to attend synchronous sessions will result in loss of 20% of Teach One grade |
| Grading Scale: | |  |  | | --- | --- | | **Score** | **Letter Grade** | | 96+ | A | | 90-95 | A- | | 86-89 | B+ | | 74-85 | B | | 70-74 | C | | 70 - | F | |
| Academic Integrity: | The projects in this course are collaborative effort. **It is OK to copy** portion of code from others doing same project and with their permission. However, there must be clear evidence that you have developed the full code by yourself. You are responsible for the entire work. The presentation of the code must also be exclusively done by you, without copying presentation of others. Exams are not collaborative and must be done individually without help from anyone inside or outside the course. |
| 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> |
| 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](https://catalog.gmu.edu/policies/student-rights-responsibilities/%23text)) |
| **COURSE SCHEDULE** | |
| Weeks (Class date) | Topics |
| 1 (Jan 26, 2022) | Introduction,  Data Download,  Software Download,  Sign Up for Teach One |
| 2 (Feb 2, 2022) | Project 1: Charlson Deyo Index  Basic SQL and Data Cleaning |
| 3 (Feb 9, 2022) | Project 1: Charlson Deyo Index  SQL for Scoring the Index |
| 4 (Feb 16, 2022) | Project 1: Charlson Deyo Index Accuracy of Predictions |
| 5 (Feb 23, 2022) | Project 1 Presentations |
| 6 (Mar 2, 2022) | Midterm Exam |
| 7 (Mar 9, 2022) | Project 2: Multi Morbidity Index  Concept & Calculation of Likelihood Ratios |
| 8 (Mar 16, 2022) | Spring Break (No Classes) |
| 9 (Mar 23, 2022) | Project 2: Multi Morbidity Index  Ontological Adjustments of Likelihood Ratios |
| 10 (Mar 30, 2022) | Project 2: Multi Morbidity Index Body System Progression |
| 11 (Apr 6, 2022) | Project 2: Multi Morbidity Index  Accuracy of Predictions |
| 12 (Apr 13, 2022) | Project 2: Multi Morbidity Index  Likelihood Ratios Associated with Rare Event |
| 13 (Apr 20, 2022) | Project 2: Multi Morbidity Index  Index of Rare Event |
| 14 (Apr 27, 2022) | EHR-based Patient Safety Indicators |
| 15 (May 4, 2022) | Measurement of Patient Safety |
| 16 (May 11, 2022) | Review |
| 17 (May 18, 2022) | Final Exam |