

College of Health and Human Services

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| **Syllabus** | |
| Course  Information | HAP 719: Advanced Statistics in Health Services Research |
| Instructor | Farrokh Alemi, Ph.D.  Office in Peterson Building or online through Zoom  Office Hours: By appointment.  Yili Lin  Email: ylin26@gmu.edu  Phone NO. : 571-201-6859  Office Hours : By appointment. |
| Course Description | Covers principles and methods of statistical data analysis and inference. Examines topics such as ANOVA techniques, linear and logistic regression, model building, analysis of categorical data and nonparametric methods. Emphasizes analyses of  health related data sets and interpretation of statistical outputs. |
| Course Objectives | **Upon completion of the course, students will be able to:**   * Prepare data obtained from Electronic Health Records (EHRs) for statistical analysis * Analyze massive data from EHRs using ANOVA * Verify assumptions of regression models * Impute portion of medical history not reported in EHRs. * Describe interactions among variables in high dimensional data * Analyze massive data using ordinary regression * Analyze massive data using logistic regression * Interpret statistical outputs * Prepare statistical reports * Present findings from statistical analysis |
| Schedule of Topics | See open web site at <http://openonlinecourses.com/statistics> |
| Course Pedagogy | The class format will combine reading, lectures, presentations, and other learning tools. The class will be interactive and require every student to be engaged in the classroom discussion and assignments. In addition to the lectures, screencasts,and timely completion of assignments, every student will be expected to teach portion of the course. We rely on the premise that students best learn when they do it and teach it to others.  Students are encouraged to use large language models including ChatGPT. Learn how to do this correctly: [PROPER instruction to language models](file:///C:\Users\falemi\Documents\Depression\Suicide\PCORI\Plan%20to%20Use%20ChatGPT.pptx) |
| AI Policy | **Basic Principle**: Use of AI in any aspect of the course, including exams, is allowed and encouraged but not required.  **What Tools**: Students can use any tool, including text-focused chatbots like ChatGPT, Copilot, or Claude; it may include image- or video-generation tools like Runway or Midjourney; it may include tools like Grammarly or other editors; it may include basic text-prediction or text-completion tools.  **When and How**: AI tools may be used for completing assignments, creating outlines, interpreting statistical models, coding, and editing. There are no restrictions on what AI tools can be used for. Comply with GMU AI guidelines, especially those that serve to protect students’ privacy and ensure accessibility. AI tools can be used in exams.  **No Reporting**: There is no need to report you have used AI tools. The citation of AI tool’s contributions is optional. |

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| Textbook(s) | * OPENINTRO STATISTICS (OIS) <https://www.openintro.org/book/stat/> * Alemi F. Big Data in Healthcare: Statistical Analysis of the Electronic Health Record (1) 1st Edition. Available at <https://www.amazon.com/Big-Data-Healthcare-Statistical-Electronic/dp/1640550631> * Course open site is at <http://openonlinecourses.com/statistics> |

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| Course Grading | Listed below are grades and academic standards for each grade awarded.  **A = 96% and above**  Clearly stands out as excellent work. An "A" grade work could be used as a model for other students to emulate. Shows excellent grasp of subject matter, conceptual integration, and excellent skills.  **A- = 90-95%**  Represents high quality performance. Shows excellent grasp of subject matter and conceptual integration. Shows a high level of thinking, analysis, application, and very good skills.  **B+ = 86-89%**  Represents very good work. Shows thorough grasp of subject matter and effective application. Shows good thinking, analysis, and good skills.  **B = 80-85%**  Represents satisfactory work. Shows adequate level of thinking, analysis, and satisfactory skills.  **B- = 76-79%**  Work is below graduate level expectations; skills are below expectation.  **C = 70-75%**  Work is clearly unsatisfactory.  **F = 70% and below**  Fails to meet minimum acceptable standards. |

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| Computer Requirements | This is a computing intensive course, and all students are required to complete assignments and projects using computer software. Health informatics professionals should know their computers well.  Minimum computer (laptop or desktop) system requirements: Multicore (preferable Intel VT/AMD-V), 8GB RAM, at least 512 GB storage (and 200GB+ free), webcam, speakers, good internet connection.  Mac computers are allowed, but students need to do additional configuration – some assignments require windows. Mac users should be able to use Windows through virtualization software. Students must be able to install software and configure their computers, configure security settings, firewall, etc.  Students are strongly encouraged to backup all contents of their computers on regular basis. Loss of data cannot be used as excuse for late or not submitted assignments/projects.  The class does not require students to purchase any specialized software. Expectations: Students are responsible for assigned readings, class content and materials. Students are also responsible for finding the right computer equipment that allows accessing the course materials online and completing all computing exercises, as well as checking email and blackboard on daily basis. |

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| Mason Honor Code | To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.  **Assisting each other is required in this course and is not considered cheating. Copying and pasting someone else’s work is consider cheating.**  [*https://oai.gmu.edu/mason-honor-code/full-honor-code-document/*](https://oai.gmu.edu/mason-honor-code/full-honor-code-document/) |

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| Individuals with Disabilities | **The university is committed to providing equal access to employment and educational opportunities for people with disabilities.**  Mason recognizes that individuals with disabilities may need reasonable accommodations to have equally effective opportunities to participate in or benefit from the university educational programs, services, and activities, and have equal employment opportunities. The university will adhere to all applicable federal and state laws, regulations, and guidelines with respect to providing reasonable accommodations as necessary to afford equal employment opportunity and equal access to programs for qualified people with disabilities.  Applicants for admission and students requesting reasonable accommodations for a disability should call the Office of Disability Services at 703-993-2474.  Employees and applicants for employment should call the Office of Equity and Diversity Services at 703-993-8730. Questions regarding reasonable accommodations and discrimination on the basis of disability should be directed to the Americans with Disabilities Act (ADA) coordinator in the Office of Equity and Diversity Services.  *(From the 2017-18 Catalog – catalog.gmu.edu)* |

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| E-Mail Policy | **Web: mail.gmu.edu**  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.  *(From the GMU Student Rights and Responsibilities* [*https://catalog.gmu.edu/policies/student-rights-responsibilities/*](https://catalog.gmu.edu/policies/student-rights-responsibilities/) *)* |

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| **Statistical software** | 1. You may use freely available R software. Examples in the course are based on R. **We provide support for R or Python only**, but students can use any software. 2. It is OK to use ChatGPT in your assignments and exam. |
| Assignments –  **30%** | Each week assignments are required to be uploaded to Blackboard. Assignments are due by Sunday, 11:55 PM, ET unless otherwise stated. Refer to the course  schedule and weekly overviews for details. |
| Peer Group Teaching  **20%** | Students are asked to teach one session of the course by preparing a narrated video and by addressing the needs of other students in the class. We rely on a method typically used in training of medical residents: "Learn one, do one, teach one." Each student is expected to not only learn the concepts in the course, and do the assignments, but also teach a portion of the course. This active participation in teaching helps students learn the concepts in the course in more depth. The best way to learn a topic is to teach it. The steps to follow are:   1. Select which the week you wish to teach. 2. A week prior to your assigned teaching, meet with the instructor and show that you have completed the assignments. 3. Prepare an AI tutor or a video guide to the assignment. The guide should give advice on how to prepare the code for the assignment. Share the AI tutor or the video with the class through Canvas. Here are some resources for preparing intelligent tutors:  [**Slides►**](http://openonlinecourses.com/Intelligent%20Tutor.pptx) [**Video►**](http://openonlinecourses.com/Prepare%20a%20Prompt%20for%20an%20Intelligent%20Tutor.mp4) [**YouTube►**](https://youtu.be/vT8bSjsGJ_c) 4. Receive students’ work and grade them pass/fail. All students are asked to submit their assignments to their peer teacher before submitting on Canvas. All students must indicate on their assignment submission who reviewed the assignment. If necessary, peer teachers should contact students by calling them and work with them to get the assignment submitted on time. Peer teachers will lose 10% of their grade for teaching, if one of their students is late or submits an incorrect assignment. |

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| Midterm **25%** and  Final Exam  **25%** | **Instructions**  Exams are in class or at monitored online sessions, open book, open access to ChatGPT or other AI services, and open internet. Exams are timed. |
| **Need Help?**  The department has assigned a tutor for students in this course. | |