# MPHS Master of Population Health Sciences

**M19-TBD Introduction to R for Clinical Research (1 credit)**
Fall 2023 (8/21/23 – 8/25/23)
Daily, 9:00 AM – 12:00 PM Central
Julius B Richmond Room, Taylor Avenue Building (TAB)

## INSTRUCTORS
Nicole Ackermann, MPH – nackermann@wustl.edu
Sarah Humble, MS – sarah.lyons@wustl.edu

## OFFICE HOURS
Available by appointment. Please email both Nicole and Sarah when contacting the instructors to ensure the quickest response.

## PREREQUISITES
NONE

## TARGET AUDIENCE
Individuals who wish to gain an understanding of R for basic data management and analysis.

## COURSE DESCRIPTION & OBJECTIVES
This course is designed to introduce medical students, clinicians and health researchers to the R programming language. Students will learn how to operate R via R Studio; import external data; create data sets; create, format and manipulate variables; and export data and results. Each session will consist of a combination of lecture and practical hands on exercises. Upon completion of this course, students will have obtained a basic understanding of the R environment.

## COMPETENCIES
- Open and navigate R Studio
- Understand the R environment
- Understand the importance of using syntax
- Know how to import/export, open/save data within R
- Troubleshoot problems and interpret errors
- Know how to change and manipulate the contents of a dataset

**Course Requirements & Software**

All Students are required to have R and R Studio available on their laptop for class. If you do not already have these programs, please download R and R Studio prior to the beginning of class. To install, please follow the instructions here: https://posit.co/download/rstudio-desktop/#download

We have also made an instructional video available on Canvas that walks you through the process.

Students are **REQUIRED** to have R Studio installed on their personal laptops **BEFORE THE FIRST CLASS (8/21/23)**. Students must bring their personal laptop, with the installed software, to each class as we will be completing hands-on exercises during class.

Students without a working version of R on their laptop will be unable to complete the course.

**Textbooks**

There are no required textbooks for this class. Free, online supplemental resources are listed in the next section.

**Resources**

- UCLA Advanced Research Computing – Overview of R, analysis tutorials, annotated output: https://stats.oarc.ucla.edu/r/
- Cheat sheets for various popular packages: https://posit.co/resources/cheatsheets/
- Overview of R and tutorials: https://www.statmethods.net/index.html
- R reference card: https://cran.r-project.org/doc/contrib/Short-refcard.pdf
- R for Data Science – overview of tidyverse packages: https://r4ds.had.co.nz/index.html

**GRADING**

Your grade will be based on:

- Class participation (15%)
- Homework & Quizzes (55%)
- Final Exercise (30%)

Grading Scale
Pass/Fail

**ATTENDANCE AND PARTICIPATION**

Class attendance is required. As a courtesy to other students, you are expected to arrive on time. An unexcused absence during this weeklong course may result in a lowered grade. Do not enroll if you have absences already planned.

**POLICY ON LATE ASSIGNMENTS**

Late assignments will result in a deduction of one grade point (A+ down to A) for each day late (including weekends) unless prior approval is obtained from the instructor or a compelling situation prevents prior approval (i.e. documented health issues or family emergencies).

## ASSIGNMENTS AND DUE DATES

Considering the short length of the course, homework assignments and quizzes will be released at the end of each class period covering basic aspects on that day's material. Assignments are due the following morning at the beginning of class.

The final exercise will be a slightly longer version of a homework assignment and quiz. It will take approximately 1 hour to complete.

| Week | Date | Topic | Assignment Due (by 9am on day listed) |
|---|---|---|---|
| **Module 1** | Aug. 21 | • Brief discussion about data and data types<br>• Discuss importance of syntax, reproducibility, using comments<br>• Orienting to the R Studio environment<br>• Working directories | ***Have R on laptop!*** |
| **Module 2** | Aug. 22 | • Importing/opening/exporting/saving data<br>• Merging, appending, and sorting data | HW1<br>Quiz 1 |
| **Module 3** | Aug. 23 | • Creating and recoding variables<br>• Missing values<br>• Functions | HW2<br>Quiz 2 |
| **Module 4** | Aug. 24 | • Diagnostic procedures and troubleshooting errors<br>• Outputting data and results – reproducible research & R markdown | HW3<br>Quiz 3 |
| **Module 5** | Aug. 25 | • Introduction to plotting<br>• Course review<br>• **Final exercise** | HW4 |

## DROP DATES

You may drop for any reason during the course of the semester. However, you may only receive a partial or no tuition reimbursement depending upon how far into the semester you drop the course. See the MPHS Student Handbook. Late withdrawals will appear on your transcript as a withdrawal.

**MPHS Academic Policy Guidelines:**

Guidelines regarding MPHS course registration and enrollment, grades, tuition obligation, and academic leave are consolidated in the **MPHS Student Handbook**. Please review this document.

**MPHS Guidelines for Academic and Non-Academic Transgressions:**

By registering for this course you have agreed to the terms of the **MPHS Academic Integrity Policy, outlined below and in more detail in the MPHS Student Handbook**. Please review this policy before submitting your first graded assignment.

**Academic Integrity/Plagiarism Policy:**
- Academic dishonesty is a serious offense that may lead to probation, suspension, or dismissal from the University. Academic dishonesty includes plagiarism (the use of someone else's ideas, statements, or approaches without proper citation). Academic dishonesty also includes copying information from another student, submitting work from a previous class for a new grade without prior approval from your instructor, cheating on exams, etc. You are responsible for reviewing WashU's academic integrity resources to become aware of all the actions that constitute academic dishonesty.
- All instances of academic dishonesty will be reported to the Office of the Registrar for investigation and potential disciplinary action. In addition, the instructor will make an independent decision about the student's grade on any assignment in question. The MPHS process regarding academic dishonesty is described in the MPHS Student Handbook

**DISABILITY RESOURCES**
It is the goal of Washington University to assist students with disabilities in removing the barriers their disabilities may pose and provide support in facing the challenge of pursuing an education at Washington University.

Washington University recognizes and accepts its professional, legal and moral responsibility to avoid discrimination in the acceptance and education of qualified students with disabilities and to provide reasonable accommodations to such students consistent with the principles embodied in the law. These guidelines apply to students seeking admittance as well as to those who become disabled while they are enrolled.

Washington University makes every effort to insure that all qualified applicants and students can participate in and take full advantage of all programs and opportunities offered within the university. Washington University encourages and gives full consideration to all applicants for admission. Washington University does not discriminate in access to its programs and activities on the basis of age, sex, sexual orientation, race, disability, religion, color or national origin.

To learn more about services provided to students with disabilities, initiate the process of formal documentation and/or to arrange for accommodations, please review the Disability Resources for the Med School at the start of the course.

**MENTAL HEALTH RESOURCES**
Mental Health Services' professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic experience. These include conflicts with

or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression.  See:  shs.wustl.edu/MentalHealth.

**SEXUAL ASSAULT RESOURCES**
You can also speak confidentially and learn about available resources by contacting Dr. Gladys Smith, PhD, Sexual Violence Prevention Therapist and Licensed Psychologist at the Medical Campus, (314) 362-2404. Additionally, you can report incidents to the Office of Student Affairs or by contacting WUSM Protective Services 314-362-4357 or your local law enforcement agency.

**BIAS RESOURCES**
The University has a process through which students and staff who have experienced or witnessed bias, prejudice or discrimination against a student can report their experiences to the University's Bias Report and Support System (BRSS) team.  For details see: diversityinclusion.wustl.edu/brss/.

**Office of the Associate Vice Chancellor for Diversity, Equity and Inclusion (DEI)**
**The DEI Training Team** designs, facilitates and leads diversity education programming for faculty, staff and students on a wide range of topics including: creating a climate of respect, the value of diversity and the role of biases in our day-to-day lives.
diversity.med.wustl.edu/training/

**The Office of Diversity Programs** promotes diversity among and prepares medical students to lead in a global society. A priority for the Office of Diversity Programs is to cultivate and foster a supportive campus climate for students of all backgrounds, cultures and identities.
mddiversity.wustl.edu/

**The Diversity and Inclusion Student Council** promotes an inclusive campus environment for all School of Medicine students.
sites.wustl.edu/disc/

**The Office for International Students and Scholars** embraces the university's mission of welcoming promising students from around the world.
wumma.wustl.edu/