

# STA 503: Introduction to R

STA 503

**SYLLABUS AND COURSE POLICIES**

Fall 2022

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**Office Hours:** Tuesday 12:30-1:30pm  
Wednesday 10am-1pm  
Thursday 1-2pm

**Course Web Page:** This course has a D2L website. I will be using it quite heavily so please make sure to check it often!

## OVERVIEW & COURSE DESCRIPTION

This is an introductory course in R programming. The major topics include setting up RStudio, R data objects, data input/output, built-in and user-defined R functions, control statement and looping, basic R plot functions, commonly used R libraries, and R markdown.

### **Student Learning Outcomes for the Masters of Science in Applied Statistics:**

1. Demonstrate an understanding of probability and statistical inference, including the fundamental laws of classical probability, discrete and continuous random variables, expectation theory, maximum likelihood methods, hypothesis testing, power, and bivariate and multivariate distribution theory.
2. Demonstrated the ability to apply the elementary methods of statistical analysis, namely those based on classical linear models, categorical methods, and non-parametric ideas to perform data analysis for the purposes of statistical inference.
3. Demonstrate proficiency in the effective use of computers for research data management and for analysis of data with standard statistical software packages, particularly SAS.
4. Learn to develop and critically assess design of experimental studies and the collection of data.
5. Apply one or more methods of statistical inference to a particular area of interest, particularly the program in the elective concentration.

6. Gain practical experience in statistical consulting and communicating with non-statisticians, culminating with interaction with research workers at a local company as part of the internship practicum.

## STUDEN LEARNING OBJECTIVES

1. To learn basic programming skills in R. Including, but not limited to defining variables, for loops, if statements, function construction and using internal packages [SLO 3].
2. To learn how to read/write data files and plot figures [SLO 4].
3. To learn the basics of the Tidyverse package [SLO 3].

## LECTURES

This class is online so there are no lectures. I will be posting annotated slides, R code, R Markdown files, and videos to the D2L website. Please check this site regularly!

## CLASS CANCELLATION POLICY

In the event that I am unable to meet a class, I will: (a) notify you in person at a prior meeting to that effect or (b) an official class cancellation notification on the *stationary of the Department of Mathematics and signed and date stamped by the Department's Secretary Sarah Malarney* will be posted on the classroom door. All other postings announcing the cancellation of this class are to be considered unofficial and are to be ignored.

## HOMEWORK

- There will be regular homework assignments for this class. Homework will be assigned at the beginning of each week and are (usually) be **due the following week**.
- You **MUST** send me an electronic copy of your homework to Dropbox on the D2L website. This will typically be in the form of a Word document from R Markdown. If the computer code does not run or I do not get the same results that you get, you will receive *at most* 50% credit for that problem. It is in your best interest to comment your code as much as possible. This will remind you what you did when you are studying and also allows me to give you partial credit.
- Statistics is very conducive to collaboration. Therefore, unless otherwise instructed, I encourage you to discuss assignments with other students. The best way to work with others on homework is to do as much as you can on your own, and then get together. If you've done the problems independently, it's more likely that one of you will have the right answer. If you do them together from the outset, you might both make the same mistakes.

## Academic and Personal Integrity

It is the responsibility of each student to adhere to the university's standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another's work and/or using ideas of another and presenting them as one's own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in the automatic failure and removal from this course. For questions regarding Academic Integrity, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to the Department Undergraduate Handbook, the Undergraduate Catalog, the Rams Eye View, and the University website at [www.wcupa.edu](http://www.wcupa.edu).

## EXAMS

- **Exams:** There is one *Midterm* exam. You must schedule a time with me to take this exam sometime AFTER Friday, October 7th, but BEFORE Friday, October 14th. Once we set up a day and time, you will have ONE HOUR to complete and turn in the exam to the appropriate Dropbox on D2L.
- **Final Exam:** You will also have a cumulative take-home exam that is due the week of Final Exams. You will submit your final document in the appropriate Dropbox on the D2L website.
- **No makeup examinations** will be given. A student who misses an examination because of a medical reason must provide **documented** evidence of serious medical incapacitation. Other reasons for missing an examination must be discussed with me **before** the day of the examination. Each case will be considered on an individual basis. The overall course grade for a student who misses an examination with a valid reason will be based on that student's remaining course work. A student who misses an examination without a valid excuse will receive a grade of zero on that examination. Sleeping through an exam is not a valid excuse and will result in a grade of zero.

## COURSE GRADE

Your course grade consists of:

Midterm Exam	30%
Homework	40%
Final Exam	30%

## ATTENDANCE POLICY:

This is an online course so there is no attendance policy.

## **COMPUTING**

This is a course on R programming so you must have access to a computer. You may either use your laptops or the computer labs in the Math Department. Any other personal computers may require you to download and install R, along with any packages previously used.

## **OFFICE HOURS**

I will hold office hours each week via Zoom. The link can be found on the D2L page. I am also frequently available by appointment. Please make sure to provide ample advance notice for these appointments.

## **STUDENTS WITH DISABILITIES**

If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about West Chester University's Services for Students with Disabilities (OSSD), please visit them at 223 Lawrence Center. Their phone number is 610-436-2564, their fax number is 610-436-2600, their email address is [ossd@wcupa.edu](mailto:ossd@wcupa.edu), and their website is at <https://www.wcupa.edu/universityCollege/ossd/>. In an effort to assist students who either receive or may believe they are entitled to receive accommodations under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, the University has appointed a student advocate to be a contact for students who have questions regarding the provision of their accommodations or their right to accommodations. The advocate will assist any student who may have questions regarding these rights. The Director for Equity and Compliance/Title IX Coordinator has been designated in this role. Students who need assistance with their rights to accommodations should contact them at 610-436-2433.

## **EMAIL POLICY**

It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.

## **REPORTING INCIDENTS OF SEXUAL VIOLENCE**

West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to comply with the requirements of Title IX of the Education Amendments of 1972 and the University's commitment to offering supportive measures in accordance with the new regulations issued under Title IX, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University Protection of Minors Policy. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: [https://www.wcupa.edu/\\_admin/diversityEquityInclusion/sexualMisconduct/default.aspx](https://www.wcupa.edu/_admin/diversityEquityInclusion/sexualMisconduct/default.aspx)

### **EXCUSED ABSENCES POLICY**

Students are advised to carefully read and comply with the excused absences policy, including absences for university-sanctioned events, contained in the WCU Undergraduate Catalog. In particular, please note that the responsibility for meeting academic requirements rests with the student, that this policy does not excuse students from completing required academic work, and that professors can require a fair alternative to attendance on those days that students must be absent from class in order to participate in a University-Sanctioned Event.

### **INCLUSIVE LEARNING ENVIRONMENT AND ANTI-RACIST STATEMENT**

Diversity, equity, and inclusion are central to West Chester University's mission as reflected in our Mission Statement, Values Statement, Vision Statement and Strategic Plan: Pathways to Student Success. We disavow racism and all actions that silence, threaten, or degrade historically marginalized groups in the U.S. We acknowledge that all members of this learning community may experience harm stemming from forms of oppression including but not limited to classism, ableism, heterosexism, sexism, Islamophobia, anti-Semitism, and xenophobia, and recognize that these forms of oppression are compounded by racism.

Our core commitment as an institution of higher education shapes our expectation for behavior within this learning community, which represents diverse individual beliefs, backgrounds, and experiences. Courteous and respectful behavior, interactions, and responses are expected from all members of the University. We must work together to make this a safe and productive learning environment for everyone. Part of this work is recognizing how race and other aspects of who we are shape our beliefs and our experiences as individuals. It is not enough to condemn acts of racism. For real, sustainable change, we must stand together as a diverse coalition against racism and oppression of any form, anywhere, at any time.

Resources for education and action are available through WCU's Office for Diversity, Equity, and Inclusion (ODEI), DEI committees within departments or colleges, the student ombudsperson, and centers on campus committed to doing this work (e.g., Dowdy Multicultural Center, Center for Women and Gender Equity, and the Center for Trans and Queer Advocacy).

Guidance on how to report incidents of discrimination and harassment is available at the University's Office of Diversity, Equity and Inclusion.

## **CAMPUS EMERGENCIES**

All students are encouraged to sign up for the University's free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone. For more information, visit [www.wcupa.edu/wcualert](http://www.wcupa.edu/wcualert). To report an emergency, call the Department of Public Safety at 610-436-3311.

## **TENTATIVE List of Topics**

- Introduction to R, RStudio, and R Markdown
- Different Objects (functions, vectors, data frames, lists, etc.)
- Summary Statistics
- Basic plotting
- Control Statements (if/else statements, for loops, etc.)
- Tidyverse package (ggplot and dplyr)

I am looking forward to teaching this class as I hope you are looking forward to taking it. Please do not hesitate to contact me if you have any questions or concerns whatsoever.

**Welcome, and Good Luck!**