

BIOSTAT 591

Introduction to R

COURSE SYLLABUS — SPRING 2020

// COURSE OVERVIEW

Course Information

Instructor: Philip S. Boonstra ([faculty profile](#))

Session: 4 weeks (May 4 - May 29, 2020)

Weekly class meeting: Wednesdays 7-8:30 pm ET in Zoom

Student hours: Wednesdays 8:30-9 pm ET in Zoom

Contact: philb@umich.edu

Course Description

This is a two-credit course for students enrolled in the online MPH program. We will cover each of the steps in the process of transforming that unwieldy spreadsheet into real data that can be wrangled, summarized, plotted, and prepared for statistical modeling.

Course Goals/Foundational Competencies (FC)

- Introduce R to MPH students who desire to be conversant in biostatistical methods but are not training to be professional biostatisticians.
- Select quantitative and qualitative data collection methods appropriate for a given public health context
- Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate
- Interpret results of data analysis for public health research, policy or practice

Learning Objectives

By the end of this class, you will be able to:

1. read in data in such a way that you can fit the linear, generalized linear, and other types of statistical models that you will subsequently learn about in Biostatistics 592, 593, and 594
2. read in common data files (.csv, .txt) into R
3. wrangle data in a format that R statistical modeling functions expect
4. conduct exploratory analyses of these data, including the generation of publication-quality descriptive graphics.
5. construct simple reports directly in R

Pre-requisites

This course is open to all students enrolled in the School of Public Health's online MPH degree program.

// COURSE REQUIREMENTS

Each weekly unit will include video lectures, coding demonstrations/exercises, readings, a Zoom session, and a homework assignment. You will be required to attend the Zoom sessions and participate in small and large group discussions. Detailed instructions for each assignment are available on the Coursera website.

Course Materials

R for Data Science by Hadley Wickham and Garrett Golemund (freely available online at <https://r4ds.had.co.nz/>)

Optional materials

- *Advanced R* by Hadley Wickham (freely available online at <http://adv-r.had.co.nz/>)
- *R Markdown: The Definitive Guide* by Yihui Xie, J. J. Allaire, and Garrett Golemund (freely available at <https://bookdown.org/yihui/rmarkdown/>)
- "Master the Tidyverse" by Garrett Golemund <https://github.com/rstudio/master-the-tidyverse>

// COURSE COMMUNICATION

To ensure that your questions are answered as promptly as possible, please follow the communications guidelines below:

Academic Support

- **Discussion Forums** are best used to interact with classmates and course staff, share resources, and help one another with questions about the course materials and assignments. You can also search through the forums to see if your questions may have already been asked and answered. I may post answers to frequently asked questions on the discussion board rather than responding to multiple individual questions to allow all students to benefit from the answer. I will monitor the forums on a regular basis to ensure questions are answered in a timely manner. Response times will be within ~24 hours during weekdays and ~48 hours over weekends or holiday periods.
- **Slack** is best used for peer-to-peer communication and community building via instant messaging and group conversations.
- **Zoom** is best used for live sessions with course staff and peers.

- **Email:** Only messages that are *private in nature* should be sent to my email address. Do not send messages asking general questions about the class; please post those on the discussion forums instead.

Technical Support

- If you need to immediately speak with a support representative regarding technical issues on Coursera, you are welcome to use the **live chat offered 24 hours a day, 7 days a week**. You can access chat support on any page of the Learner Help Center: <https://learner.coursera.help/>
- If you have a non-urgent technical issue, the [Learner Help Center](#) is a resource for detailed help articles.

Program Support

- If you have other questions or requests, email phs.support@umich.edu.

// ASSIGNMENTS & GRADING

Homework (50%)

Corresponding to each of the first three units is a RStudio Notebook, in which students will practice applying the functions and paradigms covered in the lectures to real data sets.

Final Notebook (30%)

The last notebook will be similar to the first three but will be summative in nature and require more self-direction from the student.

Participation (20%)

Participation is a key component of this course. Credit will be given for your active participation (engaged learning) rather than correct answers.

// COURSE POLICIES

What you can expect from me

> **Commitment to your learning and your success**

I believe all students are unique and will thrive in a learning environment that is challenging yet supportive of critical thinking and active learning. My goal as an instructor is to encourage

mastery, competency and transformational learning relevant to success in the field of public health. Please talk to me if there is anything you want to discuss or about which you are unclear. I want to be supportive of your learning and growth.

> **Inclusive & supportive learning community**

I believe that learning happens best when we all learn together as a community. This means creating a space characterized by generous listening, adventurous civility, humility, patience, and hospitality. I will strive to create a safe classroom environment that promotes scholarly dialogue and informed debates that are respectful of diverse perspectives. Classroom discussions, activities, and assignments dealing with sensitive issues involving social determinants of health will demonstrate these values and beliefs.

> **Openness to feedback**

I appreciate straightforward feedback from you regarding how well the class is meeting your needs. Let me know if material is not clear or when its relevance to the student learning outcomes for the course is not apparent. Please also let me know if there's an aspect of the class you find particularly interesting, helpful, or enjoyable!

> **Responsiveness**

I will monitor email as well as the discussion forums daily and respond to all messages within ~24 hours Monday-Friday (~48 hours over weekends or holiday periods).

> **Clear guidelines and prompt feedback on assignments**

I'll provide clear instructions for all assignments and a grading rubric when applicable. I'll provide detailed feedback on your submissions and update grades promptly in Coursera. I'll evaluate your class participation based on both its quantity and quality and give you feedback on your performance in this regard.

What I expect from you

> **Attend class**

You are expected to attend all scheduled Zoom meetings. If you must miss a meeting due to illness, a family emergency, a religious holiday, or some other valid reason, please get permission from me prior to the class in question. Unexcused absences will impact your overall participation grade.

> **Participate**

I encourage you to log in on a regular basis and actively participate and to ask questions in the Zoom sessions and in the discussion forums. I'll expect all of us to be respectful of each other's contributions, whether we agree with them or not.

> **Be proactive**

If you find that you have any trouble keeping up with assignments or other aspects of the course, make sure you let me know as early as possible. Make sure that you are proactive in informing me when difficulties arise during the course so that I can help you find a solution.

> **Complete assignments**

All assignments for this course will be submitted electronically through Coursera unless otherwise instructed. I encourage you to make your best effort to submit all assignments on time, but I understand that sometimes circumstances arise that are beyond our control. If you need an extension, please contact me. Assignments submitted late without prior approval will not be eligible for full credit.

> Seek help if you need it

We believe it is important to support the physical and emotional well-being of our students. If you are experiencing physical or mental health issues, we encourage you to use available resources such as those listed below. If you have a health issue that is affecting your performance or participation in the course, and/or if you need help connecting with these resources, please contact me or the SPH Office for Student Engagement and Practice via phs.support@umich.edu.

- **[Well-being for U-M Students](#)**: Embrace the concept of well-being as a multidimensional lifelong journey. Search university-wide resources (note the “virtual” location filter) and take breaks with stress-relieving videos.
- **[MiTalk](#)**: Review information on a variety of mental health topics, including recorded workshops, online lectures, and skill-building tools.
- **[Stressbusters App](#)**: View, share, store, and use campus event announcements, news alerts, student and department videos, one-touch dial emergency buttons, health tips, surveys and other features, directly on iOS and Android mobile devices.
- **[SPH Emergency Fund Request](#)**: Request support if you encounter an emergency situation or another unusual, unforeseen expense while enrolled in your degree program.
- **[Sexual Assault Prevention and Awareness Center \(SAPAC\) Chat](#)**: Your chat advocate can help answer questions about your concerns related to sexual assault, sexual harassment, stalking, or intimate partner violence and connect you to resources. SAPAC services include - but are not limited to - information and advocacy regarding housing, academics, Title IX, and medical options, and criminal legal processes.

> Inform me of any accommodations needed

If you need special accommodations due to a disability, illness, or injury, please inform me as soon as possible. In particular, if you are registered with the university's [Services for Students with Disabilities](#) and would like to activate any accommodations, please provide me with your VISA letter as early as possible. Please note that some accommodations take longer to implement than others (e.g. scheduling live captioning during Zoom sessions).

Some religious holidays may occur on regularly scheduled class days. Because available class sessions are limited in number, we will have to hold class on all such days. If you must miss a meeting due to a religious holiday, please get permission from me prior to the class in question.

> Commit to integrity

As a student in this course and at this university you are expected to maintain a high degree of professionalism, commitment to active learning and participation in this class, and also integrity in your behavior in and out of the classroom. Preparation of papers assigned on an individual basis must represent your own individual effort. When used, resource materials should be cited in conventional reference format.

To promote academic integrity and improve student outcomes this course will use a plagiarism detection service. Cheating and other forms of academic misconduct will not be tolerated and will be dealt with firmly. Student academic misconduct refers to behavior that includes plagiarism, cheating on exams or assignments, fabrication of data, falsification of records or

official documents, intentional misuse of equipment or materials (including library materials), or aiding and abetting the perpetration of such acts.

Please visit <https://sph.umich.edu/ns/student-resources/index.html> for the full Policy on Student Academic Conduct Standards and Procedures.

> Support Diversity, Equity, and Inclusion

The University of Michigan School of Public Health seeks to create and disseminate knowledge, with the aim of preventing disease and promoting the health of populations worldwide. We recognize the histories of social discrimination globally and seek to promote and extend opportunities for members of all groups that historically have been marginalized. We commit to developing the institutional mechanisms and norms necessary to promote the values of diversity, equity, and inclusion, both inside and outside our classrooms. To this end, SPH upholds the expectations that all courses will (1) be **inclusive**, (2) promote **brave discussions**, (3) follow **multicultural ground rules**, and (4) abide **by U-M policies and procedures**.

- **Inclusive courses** are those in which teachers and learners co-create and co-sustain environments that support and encourage all members to participate equitably.
- **Brave** (rather than safe) discussions promote diversity and social justice learning by acknowledging the dynamics of oppression and privilege both inside and outside the classroom.
- **Multicultural ground rules** acknowledge diverse experiences in the classroom and offer strategies for holding one another appropriately accountable.
- **U-M policies and procedures** can be found at <https://diversity.umich.edu> with additional resources and instructions for reporting discrimination at <https://sph.umich.edu/diversity-equity-inclusion/resources.html>.

// COURSE SCHEDULE

The course contains 4 units of study, each covering a particular topic of focus. Each module includes video lectures, coding demonstrations/exercises, reading assignments, a homework assignment, and a Zoom session (Wednesday 7:00 - 8:30 pm ET).

Week 1: Introducing R

Homework 1 due at the end of the week

Week 2: Reading in and wrangling data

Homework 2 due at the end of the week

Week 3: Plotting data

Homework 3 due before zoom session of week 4

Week 4: Putting it all together

Final notebook due at the end of the week