Last Updated: 10/30/23 (updated from the previous version in orange)

CUNY SPH GRADUATE SCHOOL OF PUBLIC HEALTH & HEALTH POLICY

**COURSE SYLLABUS**

**Population Health Dashboards**
**EPID 634**
**(section: 80)**
3 Credits
Fall, 2023

| | |
|---|---|
| **Time and location** | Online - Asynchronous |
| **Instructor** | Sehyun Oh, Ph.D.<br>Email: Sehyun.Oh@sph.cuny.edu |
| **Office hours** | Available by appointment |
| **Course website** | https://canvas.instructure.com/courses/7670413 |
| **Course Description** | This course will examine population health data visualization across space and time, introducing concepts of visualization literacy and the importance of presenting data in a meaningful and user-friendly format. Students will be able to differentiate between information visualization and geographic visualization of healthcare data. Students will be familiar with the design principles of population health dashboards and identify visualization techniques that best display the population health data. |
| **Course prerequisites** | None |
| **Course format** | Online |
| **Course readings and resources** | None |
| **Additional reading and resources** | • Data Analysis and Visualization in R for Ecologists (https://datacarpentry.org/R-ecology-lesson/index.html)<br>• Introduction to Data Science: Data Wrangling and Visualization with R (http://rafalab.dfci.harvard.edu/dsbook-part-1/) |

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| **Program Competencies** | **Course Learning Objectives** | **Assessment Methods** |
|---|---|---|
| *This course will help you to:* | *What skills and knowledge you will strengthen through the course:* | *Competencies and learning objectives will be assessed as part of the following:* |
| 1. Assess stakeholder data, information, and knowledge needs | Compare techniques for representing population health data | • Quizzes<br>• Presentation |
| 2. Design, develop, and implement user-centered population health information systems using effective approaches | • Understand the basic concepts of data visualization<br>○ Learn key visualization skills and tools (R programming)<br>○ Understand how to clean and organize data for analysis and complete analysis for Dashboard using R programming | • Data Science Units<br>• Quizzes<br>• Presentation<br>• Assignment |
| 3. Analyze strategies for integrating informatics knowledge within organizations and communities and maximizing the availability of information for public health through implementing solutions that ensure confidentiality, security, and integrity. | ○ Understand the advantages and disadvantages of data visualization<br>○ Understand the weaknesses of several widely-used plots<br>• Evaluate factors to be considered in the representation of health data<br>• Summarize how storytelling techniques can make data meaningful<br>• Discuss best practices in visualizing health data<br>• Describe how location can be an important aspect of visualizing public health trends<br>• Examine the principles and techniques guiding the design of population health dashboards<br>• Determine the essential features to inform the selection of visualization tools that are useful and effective<br>• Evaluate the usefulness and effectiveness of population health dashboards<br>• Apply principles of visual thinking to design a population health dashboard mockup<br>• Apply GIS to support interventions to enhance population health<br>• Identify and characterize the gaps in existing population health dashboards<br>• Analyze techniques to visualize disease trends using social media data<br>• Outline the opportunities for future research in health data visualization<br>○ Practice effective communication both in written and verbal formats | • Data Science Units<br>• Quizzes<br>• Presentation<br>• Assignment<br>• Peer Review |

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## Course Assessments

**Assignments**: Assignments will involve reproducible analysis of a published dataset. The assignment you hand in should be individual, so it must be primarily your own work and must provide attribution for any code or text that you didn't write yourself.

**Quizzes**: There will be four quizzes covering the topics up to the week the quiz is assigned. You can take each quiz once. Each quiz will take an equal weight (3.5% of the total grade).

**Peer Review:** You will be assigned to review three of your classmates' presentations for each of the mid-term and final presentations. Each of your reviews will receive two points, so completing all peer reviews will assign 12 pts (2 pts x 3 assignments x 2 presentations). Your peer reviews are not used for grading but are a learning tool for you and the student whose assignment you are reviewing.

**Data Science Units**: These are graded for completion only. You earn 3 pts for each DataCamp module you complete, each of which takes ~4hrs. You can earn a total of 30 pts by completing at least 10 modules. You will be provided with a suggested plan but are welcome to complete any combination of modules and time you wish (even non-R-based modules). You can submit these early if you want to get them out of the way, but you cannot submit for a weekly deadline that has already passed. It is recommended to keep up with these or even get ahead early in the course because they will help you with your assignments.

**Mid-term Presentation**: You will choose an existing public health dashboard or data visualization example of your interest. You will demonstrate how to use a dashboard to answer questions. You should submit a pre-recorded presentation of up to 5 minutes on this activity. This mid-term presentation will contribute to 13% of the overall grade.

**Final Presentation**: For the final project, you will select the dataset of your interest and create a Dashboard for it. You will explore data visualization using R or the platform of your choice. The final project will contribute to 23% of the overall grade. It has 2 parts - report and presentation. You will explain to the class why you chose the dataset, how you performed the analysis, and what conclusion you reached, using a pre-recorded presentation of up to 7 minutes.

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## Grading

The relative weight of each course component is as follows:

| Assessment | Weight |
|---|---|
| 10 Data Science Unit | 30% |
| Quizzes | 14% |
| Assignments | 8% |
| Mid-term Presentation | 13% |
| Final Presentation | 23% |
| Peer Review | 12% |
| | 100% |

The grading system for the CUNY SPH is as follows:

| Letter Grade | Quality Point Value | Percentage |
|---|---|---|
| A + | 4 | 97.5% - 100% |
| A | 4 | 92.5% - 97.4% |
| A- | 3.7 | 90.0% - 92.4% |
| B+ | 3.3 | 87.5% - 89.9% |
| B | 3 | 82.5% - 87.4% |
| B- | 2.7 | 80.0% - 82.4% |
| C+ | 2.3 | 77.5% - 79.9% |
| C | 2 | 70.0% - 77.4% |
| F | 0 | <70% |

Course Policies

- Students are expected to participate in assignments, quizzes, presentations, and Data Science Units throughout the course.
- Late submission is not accepted.
- There are NO pre-quizzes, extra credit options, makeup, and rewrites.
- Questions about applying rubrics (*e.g.,* how a certain answer will be graded) can be discussed only after the score for the submitted work is announced.
- The instructor will generally respond to emails within 2 business days. If you do not receive a response to an email after 2 days, please re-send it to ensure its delivery.
- Quizzes (if they include assay-type answers) and assignments will be graded and returned within 2 weeks of their submission deadline.

Grade appeals

If you want to challenge an earned final grade for a course, please use the grade appeals process. Details about the academic appeals procedures can be found in the School's academic policies under the School's current catalog.

Withdrawal

The Academic Calendar has all the deadlines to drop or withdraw from a course.

Grade of Incomplete

Incomplete final grades will not be granted unless the request is justified by a legitimate and documented emergency. The granting of an incomplete grade is at the discretion of the instructor. Refer to the School's academic policies for further details.

Accessibility

To request accommodation because of a disabling medical condition, disability, or pregnancy and recovery, confidentially set up an account with the CUNY SPH Office of Accessibility Services (OAS). Then, before the start of every semester, email OAS with your course number(s) and corresponding instructor name(s) to accessibility@sph.cuny.edu. For Religious Accommodations, contact the Associate Dean of Student Affairs & Alumni Relations, Lynn Roberts lynn.roberts@sph.cuny.edu. For Accommodations based on Status as a Victim of Domestic Violence, Sex Offense, or Stalking, contact Sahana Gupta, Title IX, and ADA-504 Coordinator at sahana.gupta@sph.cuny.edu. If you believe that an accommodation because of a disabling medical condition, disability, or pregnancy and recovery has not been appropriately determined or implemented and you wish to appeal the denial, contact Sahana Gupta, Title IX and ADA-504 Coordinator at sahana.gupta@sph.cuny.edu.

CUNY SPH follows the CUNY Reasonable Accommodations and Academic Adjustments Policy. Requesting a Disability Accommodation or Academic Adjustment and for Accommodations based on Pregnancy, Childbirth or a Related Medical Condition *(Under Title IX of the Education Amendments of 1972 students are also protected from sex-based discrimination, which includes pregnancy and recovery).* CUNY SPH complies with the CUNY Policy on Equal Opportunity and Nondiscrimination and Policy on Sexual Misconduct (Title IX). For more information, please see the Equity, Diversity & Inclusion Policy and Compliance webpage.

Academic integrity

CUNY regards acts of academic dishonesty (e.g. plagiarism, cheating on exams, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. CUNY is committed to enforcing the Policy on Academic Integrity and will pursue cases of academic dishonesty. Academic dishonesty can result in failing the assignment or even the course.

Students in this class are encouraged to help each other in figuring out how to do assignments and to share specific and limited pieces of code. However, **the work you hand in for assignments must be primarily your own**. *Your assignments will be checked using automatic plagiarism detection software.* Any borrowed code must be attributed to its author or it may be considered plagiarism. *All incidents of academic misconduct will be reported to the CUNY SPH Academic Integrity office.*

Support Resources

- IT Resources and SPH Helpdesk
- Library Services
- Writing Assistance
- Quantitative Tutoring - This is an excellent, personalized tutoring service. Particularly if you are finding the R programming challenging, use it!!
- Counseling and Wellness Services
- The Office of Accessibility Services
- Healthy CUNY works with partners inside and outside of CUNY and promotes well-being and a culture of health to foster the academic and life success of our students. Visit their website for more information about resources related to food security, mental health, sexual health, housing, COVID-19, and more.

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Consent to being recorded

Students who participate in this class with their camera on or use a profile image agree to have their video or image recorded solely to create a record for students enrolled in the class to refer to, including those enrolled students who cannot attend live. If you are unwilling to consent to recording your profile or video image, keep your camera off and do not use a profile image. Likewise, students who unmute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live.

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**Course Schedule**

Please see the CUNY Graduate School of Public Health and Health Policy's Academic Calendar for important dates, including holidays and course drop/course withdrawal deadlines. The following schedule is subject to change throughout the semester (see header for "Last Updated" date.)

| # | Date (Mon) | Topic | Data Science Unit | Assignments |
|---|---|---|---|---|
| 1 | 8/28 | • What is Data Visualization?<br>• What is R and RStudio?<br>• Setup | Unit 1 | |
| 2 | 9/4 | • Visualization methods<br>• Introduction to R | Unit 2 | |
| 3 | 9/11 | • (continued) Visualization methods<br>• Starting with Data | Unit 3 | Quiz 1 |
| 4 | 9/18 | • Data wrangling with *Tidyverse* | Unit 4 | |
| 5 | 9/25 | • Data visualization principles<br>• Reproducible projects with markdown | Unit 5 | |
| 6 | 10/2 | Assignment 1 | Unit 6 | |
| 7 | 10/9 | • Geographic Information Science (GIS) | Unit 7 | Quiz 2 |
| 8 | 10/16 | • Data visualization with *ggplot2* | Unit 8 | Presentation |
| 9 | 10/23 | • (continued) Data visualization with *ggplot2* | Unit 9 | Peer review |
| 10 | 10/30 | Assignment 2 | Unit 10 | |
| 11 | 11/6 | • Interactive visualization using Shiny | Unit 11 | Quiz 3 |
| 12 | 11/13 | • Storytelling | Unit 12 | |
| - | 11/20 | No lecture | | |
| 13 | 11/27 | • Processing JSON data | Unit 13 | |
| 14 | 12/4 | Final Presentation | | |
| 15 | 12/11 | • SQL databases and R | Unit 14 | • Peer review<br>• Quiz 4 |