Pratt
School of Information
144 W 14th St
New York, NY 10011

# INFO 658: Information Visualization

## Course information

Section: 02
Semester: Spring 2025
Meeting Dates & Times: Wednesdays, 3:00-5:50pm
Location: PMC 518
Credits: 3
Prerequisites or other restrictions: INFO 654

## Instructor Contact Information

John Lauermann, Associate Professor
Office Location: PMC 604D
Office Hours: Tuesdays 2:00-3:00pm, Thursdays 10:30am-12:30pm (sign up at this link)
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## Course Description

### Bulletin Description

This course examines the art, science and practice of information visualization. Particular emphasis is placed on the ways in which position, shape, size, brightness, color, orientation, texture, and motion influence perception of information and facilitate comprehension and analysis of large and complex bodies of information. Topics include cognition and visual perception; the aesthetics of visual media; techniques for processing and manipulating information for the purpose of visualization; studies of spatial, relational, multivariate, time-series, interactive, and other visual approaches; and methods for evaluating information visualizations.

### Detailed Description

The goal of this course is to develop data literacy and visualization skills. My goal is for you to really, deeply understand data – the structure, the applications, the limits, and, of course, how different types of data are best visualized. Over the semester we will explore different visualization techniques, beginning each time with basic concepts, design principles, and data formats. You put those concepts to use in lab assignments and a final project, receiving (and providing) peer feedback during in-class reviews.

### Course Goals

The goals of this course are to:

- explore theoretical, practical, and aesthetic perspectives on information visualization.
- examine cognitive and other research relevant to perception and information processing.
- develop familiarity with a wide variety of visual representations, with particular emphasis on selecting appropriate representations based on data and audience.
- build skills in planning, developing, and evaluating information visualizations.

### Student Learning Outcomes

By the end of this course, students will be able to:

1) critically discuss information visualizations in light of current research and practice.
2) make reasonable design choices in the context of various tasks, communications goals, and constraints of data and technology.
3) transform data into meaningful and effective visualizations using current software and tools.

## Course Requirements

### Sources and Materials

You do not need to buy any materials for this course. Readings are available on Canvas. Software is either open source, licensed through Pratt, or available with free student licenses.

Textbooks:

Brown, L. (2021) *Tableau Desktop Cookbook.* O'Reilly. [available on Pratt library ebooks at https://cat.pratt.edu/record=b2059706]

Chang, W. (2024) *R Graphics Cookbook*. O'Reilly [open access version at https://r-graphics.org/]

Sievert, C. (2020) *Interactive Web-Based Data Visualization with R, plotly, and shiny*. CRC Press [open access version at https://plotly-r.com/]

Wilke, C. (2019) *Fundamentals of Data Visualization.* O'Reilly. [open access version available at https://clauswilke.com/dataviz/]

## Assignments

Lab reports (45% of course grade; grading rubric linked here)
Three lab reports will assess your ability to interpret and visualize data (10 points each). For each assignment you will turn in a post on the course website. Each post includes:

- a written narrative that explains your workflow, analyzes data, and interprets graphics
- graphic(s) that you created, designed using relevant best practices

On weeks when assignments are due, you'll present a draft in class, and then submit the report on Canvas by the end of the week (Saturdays at 11:59pm).

Workshop log (30% of course grade; grading rubric linked here)
Every week we will do a workshop activity in class, covering software tutorials or working sessions related to your final project. Keep a weekly log of technical skills that might be useful to you in the future, challenges you encountered, and whatever you produced (e.g. if you're recording a tutorial, you might include your code and finished data viz). (~200 words per entry; 2 points per week over 15 weeks).

Final project (25% of course grade; grading rubric linked here)
The final project is an independent analysis in which you will be asked to design a methodology and analyze a problem using relevant visualization techniques. The specific format can vary based on your professional goals. We'll work on this throughout the semester, with a series of workshops. The graded components include:

- an oral presentation (5 points, due last day of class)
- the finished product (20 points, due last day of exam week)

## Assessment & Grading

| Assessment | Deadline | % of grade | Grading criteria |
|---|---|---|---|
| Workshop log | Every week | 30% | See rubric here |
| Lab report 1 | Feb 15 | 15% | See rubric here |
| Lab report 2 | March 29 | 15% | See rubric here |
| Lab report 3 | April 26 | 15% | See rubric here |
| Presentation | May 14 | 5% | See rubric here |
| Finished product | May 16 | 20% | See rubric here |

*Pratt Institute Grade System*

| Grade | Score | Evaluation |
|---|---|---|
| A | 96-100 | Excellent |
| A- | 90-95 | Good |
| B+ | 87-89 | Average |
| B | 83-86 | Average |
| B- | 80-82 | Average |
| C+ | 77-79 | Acceptable |
| C | 73-76 | Acceptable |
| F | 0-72 | Failure |
| WF | | Withdrawal Failing (Lack of attendance) |

Note: C is the lowest passing grade for graduate students.

## Course Calendar/Schedule

| Date | Classroom activities | Readings & assignments |
|---|---|---|
| Week 1<br>[1/29] | *Lecture*: Introduction<br><br>*Workshop:* DataWrapper | *Readings*:<br>Wilke, C. (2019) *Fundamentals of Data Visualization,* Ch. 2 |
| Week 2<br>[2/5] | *Lecture*: Data structures<br><br>*Workshop:* Tableau, pt 1 | *Readings*:<br>Brown, L. (2021) *Tableau Desktop Cookbook,* Chs. 1-4<br>Wilke, *Fundamentals*, Chs. 3 & 5 |
| Week 3<br>[2/12] | *Lecture*: Visualization principles<br><br>*Workshop:* Tableau, pt 2 | *Readings*:<br>Brown, *Tableau Cookbook*, Chs. 8-11<br>Wilke, *Fundamentals*, Chs. 4 & 19 |
| Week 4<br>[2/19] | *Guest lecture*:<br>Alex Strada, *Data Visualization for Collective Mobilities* | **Meet at the DeKalb Gallery from 3:30-5:00 this week.**<br><br>Gallery tour and artist talk at the Collective Mobilities exhibition. |
| Week 5<br>[2/26] | *Presentations*: Lab 1 drafts<br><br>*Workshop*: Research design for final project | *Assignments*:<br>Lab 1 due on Saturday, March 1 |
| Week 6<br>[3/5] | *Lecture:* Visualizing amounts & distributions<br><br>*Workshop:* R, pt 1 | *Readings:*<br>Chang, W. (2024) *R Graphics Cookbook*. Chs 1, 3, 6<br>Wilke, *Fundamentals,* Chs. 6 & 7 |
| Week 7<br>[3/12] | *Lecture:* Visualizing proportions & relationships<br><br>*Workshop*: R, pt 2 | *Readings:*<br>Chang, *R Cookbook,* Chs 5, 9, 10<br>Wilke, *Fundamentals,* Chs. 10, 11, 12<br><br>*Assignments:*<br>First half of workshop log due on Saturday, March 15 |
| Week 8<br>[3/19] | No class. Enjoy the week! | |

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|---|---|---|
| Week 9<br>[3/26] | *Presentations*: Lab 2 drafts<br><br>*Workshop*: Data pipeline for final project | *Assignments:*<br>Lab 1 due on Saturday, March 29 |
| Week 10<br>[4/2] | *Guest lecture:*<br>Joette Jones, *AI + Design: How Emerging Technologies Can Empower Designers and Artists*<br><br>*Workshop:* Trends in Tableau or R | *Readings*:<br>Brown, *Tableau Cookbook,* Ch. 5<br>Chang, *R Cookbook,* Ch. 4<br>Wilke, *Fundamentals*, Ch. 13 & 14 |
| Week 11<br>[4/9] | *Lecture:* Visualizing spatial data<br><br>*Workshop:* Maps in Tableau or R | *Readings*:<br>Brown, *Tableau Cookbook*, Chs 6 & 18<br>Sievert, C. (2020) *Interactive Web-Based Data Visualization with R, plotly, and shiny*. Chs 2-4<br>Wilke, *Fundamentals,* Ch. 15 |
| Week 12<br>[4/16] | *Lecture*: Visualizing network data<br><br>*Workshop*: Network graphics in Gephi or R | Readings:<br>Chang, *R Cookbook,* Ch 13 (4-5)<br>Gephi Tutorials: Quick Start Guide and Visualization |
| Week 13<br>[4/23] | *Presentations:* Lab 3 drafts<br><br>*Workshop*: Graphics & layout for final project | *Assignments:*<br>Lab 3 due on Saturday, April 19 |
| Week 14<br>[4/30] | *Lecture:* Dashboards<br><br>*Workshop:* Dashboards in Tableau or R | *Readings:*<br>Brown, *Tableau Cookbook*, Chs. 7 & 19<br>Sievert, *Interactive R,* Chs. 9, 10, 13<br>Okonov, E. (2023) Making dashboards optimal for human brain processing. *Nightingale*<br>Wilke, Chs. 22 & 23 |
| Week 15<br>[5/7] | *Lecture:* Storytelling<br><br>*Workshop:* User testing for final project | *Readings:*<br>Amabili, L. (2021). "From Storytelling To Scrollytelling: A Short Introduction and Beyond*" *Nightingale*<br>Brown, *Tableau Cookbook,* Ch 13<br><br>*Assignments:*<br>Second half of workshop log due Saturday, May 10 |
| Week 16<br>[5/14] | *Presentations:* Final project | *Assignments:*<br>Presentations in class on Wednesday (May 14)<br>Final product due on Friday (May 16) |

# Policies

The following abbreviated set of policies is especially relevant to this class. Full details on policies and procedures can be found on the Pratt website or in the Office of the Vice President for Student Affairs, Main Building, Lower Level.

## Community Standards

All Pratt students, faculty, and staff members are expected to value and uphold the community standards essential to the pursuit of academic excellence and social responsibility. These include expectations for social conduct, academic integrity, non-discrimination, and other policies described in the link above, and apply to all Pratt-sponsored activities, on or off campus.

## Academic Integrity

Academic integrity at Pratt means using your own and original ideas in creating academic work. It also means that if you use the ideas or influence of others in your work, you must acknowledge them.

At Pratt,

- We do our own work,
- We are creative, and
- We give credit where it is due.

When students submit any work for academic credit, they make an implicit claim that the work is wholly their own, completed without the assistance of any unauthorized person. These works include, but are not limited to exams, quizzes, presentations, papers, projects, studio work, and other assignments and assessments. In addition, no student shall prevent another student from making their work. Students may study, collaborate, and work together on assignments at the discretion of the instructor.

Examples of infractions include but are not limited to:

1. Plagiarism, defined as using the exact language or a close paraphrase of someone else's ideas without citation.
2. The supplying or receiving of completed work including papers, projects, outlines, artworks, designs, prototypes, models, or research for submission by any person other than the author.
3. The unauthorized submission of the same or essentially the same piece of work for credit in two different classes.
4. The use of generative artificial intelligence (AI) to produce or to improve work, whether visual or textual, except when called for by an assignment or instructor and acknowledged transparently as one tool among others in the creative process.

The Academic Integrity Standing Committee (AISC) is charged with educating faculty, staff, and students about academic integrity practices. Whenever possible, we strive to resolve alleged infractions at the most local level possible, such as between student and professor, or within a department or school. When necessary, members of this committee will form an Academic Integrity Hearing Board to hear cases regarding cheating, plagiarism, and other infractions described below; these infractions can be grounds for citation, sanction, or dismissal. Detailed procedures are explained in the full version of the Academic Integrity Policy.

## Attendance Policy

Consistent attendance is essential for the completion of any course or program. Attending class does not earn students any specific portion of their grade, but is the pre-condition for passing the course, while missing class may seriously harm a student's grade. Pratt Institute respects students' requirements to observe days of cultural significance, including religious holy days, and recognizes that some students might need to miss class to do so. In this, or other similar, circumstance, students are responsible for consulting with faculty ahead of time about how and when they can make up work they will miss. Reasonable accommodations for students with documented disabilities will continue to be provided, as appropriate. For full details, see Pratt's Attendance Policy.

The expectations for this class are as follows:
*Students with extensive absences (three or more for any reason) may be required to drop the course or may receive a failing grade at the discretion of the instructor.*

## Academic Support

Multiple academic support resources are available to students across campus:

- For assistance with time management and/or studio, subject, and software tutoring, contact the Student Success Center at success@pratt.edu
- For assistance with writing assignments, contact the Writing and Tutorial Center at wtc@pratt.edu. The Pratt Libraries can also help with research and citations.
- Academic advisors are also a great resource; students can find their advisor's contact information or schedule an appointment through Starfish.

## Accessibility

The Learning/Access Center (L/AC) coordinates access for students with disabilities. Students who identify as having any type of disability are entitled and encouraged to enroll with the L/AC in order to determine and implement reasonable accommodations. Contact the Learning/Access Center at lac@pratt.edu or 718.802.3123 for information or to schedule an appointment.

## Title IX and Sexual Misconduct Policy

Pratt Institute is committed to fostering an environment that is safe, secure and free from sex discrimination and sexual harassment, sexual violence, dating and domestic violence, and stalking among all forms of sexual misconduct. The Institute takes prompt and appropriate action to address misconduct, end a hostile environment if one has been created, and prevent the recurrence of a hostile environment. To submit a concern, please use the Title IX and Sexual Misconduct Disclosure Form. For full details, see the Title IX and Sexual Misconduct Policy.

If you inform me of an issue of sex discrimination or sexual misconduct, I will keep the information as private as I can. However, as a faculty member, I am a mandatory reporter of sexual misconduct and required to bring it to the attention of the Institute's Title IX Coordinator, who can also be contacted at titleix@pratt.edu. You can also speak to someone confidentially by contacting our confidential resources in Health Services or the Counseling Center.

## Nondiscrimination and Anti-Harassment Policy

Pratt is committed to fostering a welcoming, safe, non-discriminatory, and harassment-free educational, living, and working environment for its community. To submit a concern, please use

the Discrimination and Harassment Disclosure Form, or place an anonymous report in confidence using EthicsPoint. For full details, see the Nondiscrimination and Anti-Harassment Policy.

## Wellbeing

Pratt is dedicated to creating a culture where the entire community can flourish and thrive. Taking time to care for yourself and seeking appropriate support is important to achieving your academic and professional goals. Several resources are available through Starfish, including our Student Advocate and Care Coordinator, who can also be reached at 718.399.4546 or studentadvocate@pratt.edu. If you or anyone you know experiences overwhelming academic stress, persistent difficult feelings, or challenging life events, the Counseling Center can be reached 24/7 by calling 718.687.5356. To schedule a consultation, please call or email therapy@pratt.edu

## Starfish

Starfish provides students with contact information for advisors, instructors, department chairs, and support services across the campus. Faculty can also use Starfish to inform students of their progress in class and connect them with resources. Students are contacted by support offices whenever a flag is raised.

## Public Safety & Emergency Contacts

The Department of Public Safety provides 24-hour-a-day protection to the campus, including an emergency response guide. Contact Public Safety at security@pratt.edu or 718.636.3540. The Pratt Emergency Alert System is used to send urgent messages to registered mobile devices and emails (faculty, staff, and students have the option to opt-out, which must be renewed each year). You can update your emergency contact information in the Safety section of OnePratt.

## School of Information Portfolios

Work completed for this course may be included in your portfolio. For more information on each program's portfolio requirements, please visit the program's respective webpage:

MS Library & Information Science Portfolio (link)
MS Information Experience Design Portfolio (link)
MS Data Analytics and Visualization Portfolio (link)
MS Museums and Digital Culture Portfolio (link)

The research project from this course may satisfy one or more portfolio student learning objectives for your program. For example, MS DAV students have used this to address the Research and/or Technology objectives, while MS LIS students have used it to address the Technology objective. You are encouraged to meet with your advisor about including projects in your portfolio.