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NC State Syllabus Template

Instructions:

- Text in **[]** represents placeholders for inserting text. Delete the **[]** and modify any associated text or replace it with your own.
- Words in *italics and yellow highlight* represent instructions. **Remember to delete all instructions.**
- **Examples** are provided. You can edit/copy, or customize for your course.
- Do not change headings or subheadings. These meet accessibility requirements for formatting.
- If you wish to download it as a PDF, please run the [Google Accessibility add-on Grackle](#) and download it as a pdf from within the add-on to maintain accessibility.
- This template helps to meet some of the [standards of Quality Matters Higher Education Rubric, 7th Edition](#) and [NC State University's Policies for Course Syllabus](#).
- Last updated: August 2025
- **Delete this page from your finished syllabus before distribution.**

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ST 495-001/590-001 Course Syllabus

Data Visualization

Spring 2026

Instructor Information

Name	Office Phone	Email	Office Location
Dr. Dan Harris	919-515-1924	doharris@ncsu.edu	SAS 4264
Adrian Thananopavarn (TA)		apthanan@ncsu.edu	



Dan Harris

Office Hours

Dr. Harris: Fridays from 10:30-11:30 either in-person (SAS 4264) or via Zoom link, or by appointment (please request an appointment via email, with the understanding I will respond within one business day). **Kyle**

McKee (TA): Time TBD either in-person (SAS 1101) or via Zoom link.

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Preferred Method of Communication & Response Time

- **Preferred method of communication:** If you need to contact me directly, my preferred method of communication is email. You can expect to receive a response within one business day (i.e. not over the weekend). If I email you directly, please strive to respond within one business day. It is recommended that you check your NC State email at least once a day to stay on top of course communications.
- **Asking questions about the course:** If you have a question about the course or its content, you can email me or post your question on the Student Discussion Forum in Moodle. You can expect to receive a response within one business day (i.e. not over the weekend).
- **Email guidelines:** Always include a descriptive, specific, but concise subject. Please provide adequate context for your question in order to ensure I fully understand your email. Be sure to use your NC State email account.

Course Information

Course Website: [ST 495/590 Moodle Site](#)

Meeting Time and Location: TuTh, 8:30am-9:45am, 1108 SAS Hall

Course Credit Hours: 3

Catalog Description

This course explores concepts and techniques in data visualization, equipping students with the skills to create sophisticated and impactful visual representations of data. Emphasis is placed on understanding the theoretical foundations, capturing and managing data, applying advanced visualization tools, and evaluating the effectiveness of different visualization techniques.

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Structure

Structure

The majority of this course is **synchronous**, delivered through real-time, face-to-face class sessions. Additional materials and activities are delivered through **Moodle**, a secure and easy-to-use online learning platform. Live lectures will be recorded for asynchronous viewing on Moodle.

- Lectures: Two per week
- Homework: 11 total assignments (roughly weekly)
- Exams: Two midterm exams and one final exam.

Meeting Time and Tool Used

Class meets every Tuesday and Thursday – excepting NCSU holidays and Wellness Days – from 8:30am-9:45am in room 1102 in SAS Hall. All lectures are recorded for asynchronous viewing over Panopto and can be accessed via the class Moodle site.

Prerequisites/Corequisites

Proficiency in programming [preferably R – equivalent of ST 308], familiarity with statistics and data analysis [equivalent of ST 311/312]

Minimum Technical and Digital Information Literacy Skills

Required technical Skills:

- Navigate and use Moodle, NC State’s Learning Management System.
- Use Gmail, including attaching files to email messages.
- Create and submit files in commonly used formats (MS Word, Google Docs, pdf’s).
- Download and install software as needed (see [section on required software](#)).
- Download and upload attachments.
- Use the Zoom web conferencing tool.

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- Post to discussion boards and forums.

Required digital information literacy skills:

- Perform online research using various search engines and library databases. Visit [NC State University Libraries](#).
- Use online search tools for specific academic purposes, including the use of search criteria, keywords and filters.

General Education Program (GEP) Information

GEP Category Fulfilled

None

GEP Corequisites

None

Artificial Intelligence

In this course, students are encouraged to explore and utilize generative AI tools, such as chatbots, text generators, paraphrasers, etc., as part of their learning and coursework. These tools can be valuable for brainstorming, drafting, and enhancing your understanding of the material. However, it is important to critically assess and cite any AI-generated content used in your assignments and projects. Students are expected to demonstrate their own understanding and critical thinking in their final submissions. Proper attribution and transparency about your usage of an AI tool are expected.

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Students are encouraged to use generative AI tools as assistive collaborators throughout the visualization workflow, not as replacements for judgment or design responsibility. Appropriate uses include brainstorming alternative visual encodings for a given audience and task, stress-testing draft captions or annotations for clarity and tone, and generating critique prompts that help articulate why a visualization succeeds or fails. AI can also support technical work in R—such as translating conceptual design ideas into initial ggplot2 scaffolding, refactoring plotting code into reusable functions, identifying potential pitfalls in data preparation, or suggesting accessibility improvements (e.g., color-blind-safe palettes or annotation strategies). For writing-heavy components, students may use AI to draft and revise figure captions, stakeholder memos, and reflection responses, provided the final submission reflects the student’s own analytical decisions and voice. All AI use must be disclosed in a brief statement describing how the tool was used and what design decisions remained the student’s responsibility.

General Education Program (GEP) Information

GEP Category Fulfilled

None

GEP Corequisites

None

Learning Outcomes

1. **Design effective visualizations for decision-making** by aligning audience, task, and context with appropriate graphical encodings.
2. **Critique visualizations rigorously and constructively**, using perceptual principles and evidence-based design language to recommend specific improvements.
3. **Prepare and structure data for visualization** using reproducible R workflows that support clarity, transparency, and iteration.
4. **Implement a broad visualization toolkit in R**, including univariate, bivariate, multivariate, spatial, temporal, and model-based graphics using ggplot2 and related packages.

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5. **Evaluate and select chart types strategically**, recognizing when common visual forms mislead and when alternatives better support the analytical goal.
6. **Communicate uncertainty, models, and statistical results honestly**, using visual designs that balance interpretability with rigor for nontechnical audiences.
7. **Apply visual storytelling techniques** to build coherent narratives from exploratory analysis through polished, publication-quality figures.
8. **Refine and polish visualizations for accessibility and impact**, incorporating color, annotation, layout, and (when appropriate) interactivity to enhance comprehension.

Course Materials

Required textbook

Kabacoff, "Modern data visualization with R," Chapman & Hall, 2024. eBook available on-line through NCSU Libraries or on Github

Optional textbook

Schwabish, "Better data visualizations: A guide for scholars, researchers, and wonks," Columbia University Press, 2021. Available on-line through NCSU Libraries

Technology Requirements

NC State University Libraries offers [Technology Lending](#), where many devices are available to borrow for a 7-day period. [Computer labs](#) are available in various locations around campus for student use.

Computer

A laptop computer is [required/recommended] for students taking this course. NC State's Office of Information Technology provides recommendations for [your computer at NC State](#).

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Software and digitally-hosted course components

You will be required to perform data analysis, generated written reports, and presentation materials as a part of this course. There are no specified tools required to perform these tasks, but it is recommended that you take advantage of tools that are either open source or part of NC State's enterprise tools. See [information about their purpose, how to access them, accessibility information, and privacy policies](#).

Other Student Expenses

- None

Communication Guidelines

Respecting our learning community

The [NC State Code of Student Conduct](#) outlines expectations for behavior in the classroom (whether virtual or physical) and the consequences for students who violate these expectations. Any behavior that impacts other students' ability to learn and succeed will be addressed but expressing diverse viewpoints and interpretations of course content is welcome.

Community guidelines for this course include:

- Use a respectful tone in all forms of communication (email, written, oral, visual).
- Maintain professionalism (avoid slang, poor grammar, etc.) in your written communication.
- Respect regional dialects and culturally embedded ways of oral communication.
- Stay home or in your dorm room if you are exhibiting symptoms of a contagious illness (fever, chills, etc.).
- Enter our virtual and/or physical classroom community respectfully by refraining from lewd or indecent speech or behavior, helping to maintain a safe physical environment, not using your cell phone for voice or text communication except when explicitly given leave to do so, and not attending class under the influence of any substance.

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- Treat each community member with respect by not recording others without their consent or engaging in any form of hazing, harassment, intimidation, or abuse.
- Respect cultural differences that may influence communication styles and needs.]

Plan for interaction between instructors and students

Regular communication will be as follows:

- The instructor will post an overview of activities for the coming week no later than Monday morning of each week that will appear in the Announcements section of the Moodle site and be transmitted to all students via email.
- The TA will provide feedback on assignments approximately one week after they are submitted.
- The instructor and TA will hold weekly drop-in office hours that will be accessible both in person or via Zoom.

Policies regarding other communications:

- The instructor or TA will inform students of any changes in assignment dates, exam schedules or other important information via posts in the Announcements section of Moodle, which will also be relayed via email.
- The instructor or TA will answer any question directed to them in the Student Discussion Forum within one business day of posting.
- The instructor and the TA will respond to questions posed via email within one business day.
- The instructor will be available after each class meeting (up to ten minutes) for discussions with students.
- Students may make requests via email for appointments to meet with the instructor outside of class and office hours.

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Expectations for learner participation and interaction

Some course activities, including synchronous class sessions and Moodle Forums, will require you to interact with other students in the course. Any specific communication expectations, including frequency and content, are detailed in the information about each assignment or activity when it appears in the course.

Grading

Grading criteria, details

Component	Weight	Details
Weekly exercises	30%	Weekly (approximately) graded, hands-on visualization exercises initiated in-class. Some assignments will be completed in-class and others will be completed and submitted either in-class or completed and submitted outside of class. The lowest grade will be dropped.
Online discussions	20%	Weekly asynchronous discussion consisting of one original post and one substantive reply.
Midterm Project	20%	A short, self-contained visualization project due around midsemester. Students analyze a new dataset, develop a small set of well-justified figures, and submit a brief written rationale explaining audience, task, and design decisions.
Final project	30%	A multi-figure visualization project addressing a real data-driven question for a defined audience. Includes polished figures, captions, and a short narrative demonstrating technical proficiency, design judgment, and communication clarity.

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Grading scale

This Course uses Standard NCSU Letter Grading:

97	≤	A+	≤	100
93	≤	A	<	97
90	≤	A-	<	93
87	≤	B+	<	90
83	≤	B	<	87
80	≤	B-	<	83
77	≤	C+	<	80
73	≤	C	<	77
70	≤	C-	<	73
67	≤	D+	<	70
60	≤	D	<	67
0	≤	F	<	60

Requirements for earning a grade of “Satisfactory”

If you are taking this course for credit only (S/U), your grade will be reported as S (Satisfactory) when coursework is equivalent to a C- or better or U (Unsatisfactory) when coursework is equivalent to less than a C-. For more information, see the [Credit Only Courses regulation](#).

Requirements and procedures for auditing this course

Auditing this course is approved on a case-by-case basis. Please contact the course instructor to attain approval. Refer to the [Audit regulation](#) for more information and links to required forms.

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Course Schedule

Please note: the course schedule is subject to change.

Week Beginning	Topics	Important Dates
12-Jan	Course Intro, Storytelling With Data	
19-Jan	Perception and Cognition in	20-Jan: Last day to add without permission
26-Jan	Tools: R, Excel, PowerBI	26-Jan: Census Day
2-Feb	Data Input and Cleaning	
9-Feb	Univariate Categorical Data	
16-Feb	Univariate Quantitative Data	17-Feb: Wellness Day
23-Feb	Bivariate Categorical v. Categorical, Quantitative v. Quantitative	
2-Mar	Bivariate Categorical v. Quantitative	
9-Mar	Multivariate Graphs	12-Mar: Midterm Project due
16-Mar	Spring Break	
23-Mar	Maps	25-Mar: Drop Day
30-Mar	Time Series	
6-Apr	Statistical Models	
13-Apr	Other Plots, Customizing Graphs	
20-Apr	Customizing Graphs, Interactive Visualization	
27-Apr	Interactive Visualization	28-Apr: Last Day of Class, 1-May: Final Project Due
4-May		8-May: Grades Due

Course Policies

Late assignments

Late assignments will not be accepted without approval from the instructor at least 24 hours prior to the submission date and time.

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Incomplete grades, withdrawals

Information on incomplete grades can be found at [REG 02.50.03 – Grades and Grade Point Average](#). If you encounter a serious disruption to your work not caused by you and you would have otherwise completed the course, contact your instructor as soon as you can to discuss the possibility of earning an incomplete in the course for the semester, including an agreement on when the remaining work must be done to change the grade to the appropriate letter grade.

If you must drop a course or withdraw from the University due to hardship beyond their control, see [Withdrawal Process and Timeline | Student Services Center](#) for information and instructions.

Attendance

- Attendance at in-person class meetings is encouraged so that students can interact and ask questions of the instructor but is not required.

Related NC State Policy: [REG 02.20.03 – Attendance Regulations](#)

University Policies

Academic integrity and honesty

Students are required to comply with the university policy on academic integrity found in the [Code of Student Conduct 11.35.01 sections 8 and 9](#). Therefore, students are required to uphold the Pack Pledge: “I have neither given nor received unauthorized aid on this test or assignment.” Violations of academic integrity will be handled in accordance with the [Student Discipline Procedures](#).

Please refer to the [Academic Integrity](#) web page for a detailed explanation of the University’s policies on academic integrity and some of the common understandings related to those policies.

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Student privacy

Originality Checking Software

Software is not used in this course to detect the originality of student submissions.

Class recording statement:

In-class sessions are recorded in such a way that they might also record students in this course. These recordings MAY be used beyond the current semester or in any other setting outside of the course. Contact your instructor if you have concerns.

Class privacy statement:

This course requires online exchanges among students and the instructor, but NOT with people outside the course. Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web postings, where relevant to the course. Examples include online discussions of class topics and posting of student coursework. All students are expected to respect each other's privacy by not sharing or using such information outside the course.

Other Policies

Students are responsible for reviewing the NC State University PRR's which pertain to their course rights and responsibilities:

- [Equal Opportunity and Non-Discrimination Policy Statement](#) and [additional references](#)
- [Code of Student Conduct](#)
- [Grades and Grade Point Average](#)
- [Credit-Only Courses](#)
- [Audits](#)

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Student Resources

Academic and Student Affairs maintains a website with links for student support on campus, including academic support, community support, health and wellness, financial hardship or insecurity, and more. [Find Help on Campus.](#)

Disability resources

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the [Disability Resource Office \(DRO\)](#). For more information on NC State's policy on working with students with disabilities, please see the [Policies, Rules and Regulations page maintained by the DRO](#) and [REG 02.20.01 Academic Accommodations for Students with Disabilities](#).

Safe at NC State

At NC State, we take the health and safety of students, faculty and staff seriously. [The Office of Equal Opportunity](#) supports the university community by providing services and resources to support and guide individuals in obtaining the help they need. See the [Safe at NC State webpage](#) for resources.

Supporting Fellow Students in Distress

As members of the NC State Wolfpack community, we each share a personal responsibility to express concern for one another and to ensure that this classroom and the campus as a whole remain a healthy and safe environment for learning. Occasionally, you may come across a fellow classmate whose personal behavior concerns or worries you, either for the classmate's well-being or yours. If you feel this way, I would encourage you to report this behavior to the [NC State CARES website](#). Although you can report anonymously, it is preferred that you share your contact information so they can follow up with you personally.

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Course Evaluations

ClassEval is the end-of-semester survey for students to evaluate the instruction of all university classes. The current survey is administered online and includes 12 closed-ended questions and 3 open-ended questions. Deans, department heads, and instructors may add a limited number of their own questions to these 15 common-core questions.

Each semester students' responses are compiled into a ClassEval report for every instructor and class. Instructors use the evaluations to improve instruction and include them in their promotion and tenure dossiers, while department heads use them in annual reviews. The reports are included in instructors' personnel files and are considered confidential.

Online class evaluations will be available for students to complete during the last two weeks of the semester for full-semester courses and the last week of shorter sessions. Students will receive an email directing them to a website to complete class evaluations. These are available at 8 am on the first day of finals.

- Contact ClassEval Help Desk: classeval@ncsu.edu
- [ClassEval website](#)
- [More information about ClassEval](#)

Syllabus Modification Statement

Our syllabus represents a flexible agreement. It outlines the topics we will cover and the order in which we will cover them. Dates for assignments represent the earliest possible time they would be due. The pace of the class depends on student mastery and interests. Thus, minor changes in the syllabus can occur if we need to slow down or speed up the pace of instruction.