

Syllabus

This syllabus is a living document. I will update it as needed throughout the semester. Please check back periodically for updates.

Course Information

- **Location:** Nutrien 135 (lecture) and Nutrien 103 (labs)
- **Time:** Wednesday 1:00 - 1:50 PM and Friday, 1:00 – 2:40 PM
- **Instructor:** Jude Bayham
 - Office: Nutrien 203
 - Email: jbayham@colostate.edu
 - Office Hours: Wednesday 2–3PM, or by appointment ([book here](#))
- **Teaching Assistant:** Charlotte Wachter
 - Email: Charlotte.Wachter@colostate.edu
 - Office Hours: Monday 3-4PM in Nutrien 165

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- `toc { :toc } ##` Course Description

The world generates 2.5 quintillion bytes of data each day. One of the key modern business challenges is transforming that data into actionable insights that improve decision making (i.e., data-driven decision making). Transforming data into information is not magic. It requires understanding the decision problem, organizing and processing data, analyzing data, and finally presenting information. This course will introduce you to this process of transforming data into actionable insights and build a core set of competencies with modern software.

Learning Objectives

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

1. Recognize how to efficiently acquire data from a variety of sources
2. Implement best practices for using software
3. Demonstrate data literacy
4. Use R and data visualization tools to read, manipulate, and organize data in a variety of structures and formats
5. Examine real-world business and policy questions using appropriate data, analytical techniques, and visualizations
6. Support business and policy recommendations by conveying findings as a comprehensive story in a manner appropriate for business settings and policy makers
7. Construct appropriate summary statistics and analyses to inform business and policy decisions
8. Design interactive data visualizations to inform business and policy decisions

This course will contribute to several DARE Learning Outcomes:

- You will develop **Technical Competence** and **Problem-solving Skills** while studying *Ag Business* and *Environmental and Resource Economics* issues, not to mention, learning to code in R and developing visualizations in Tableau.
- You will develop **Communication Skills** and **Leadership** skills as you work in teams on problem-driven projects and communicate the results of your analyses to the instructors and your peers.

Course Materials and Software

All **course materials** are freely available on the course website. There is no single textbook that you need to purchase. However, I will assign readings out of the following book:

- Knaflitz, Cole. [Storytelling With Data: A Data Visualization Guide for Business Professionals](#), Wiley, 2015. *You can access an online version of this book through the CSU Library*

I will post copyright-restricted materials on the [Canvas site](#).

The course will require the use of [R \(statistical computing software\)](#) and its companion [RStudio \(integrated development environment\)](#), as well as [Visual Studio Code \(VS Code\)](#).

- You can download R from the Comprehensive R Archive Network (CRAN) here: <https://cran.r-project.org/mirrors.html>. After installing R, you can download and install RStudio from here: <https://posit.co/download/rstudio-desktop/>. Detailed instructions for installing R and RStudio are here : <https://rstudio-education.github.io/hopr/starting.html>.
- You can download VS Code here: <https://code.visualstudio.com/download>. Detailed instructions for installing VS Code are here: <https://code.visualstudio.com/docs/setup/setup-overview>.

You will need to use these tools outside of class, so I recommend installing them on your own computer. Otherwise, it will be your responsibility to use the computer labs outside of class to complete assignments.

We will also use Github throughout the semester. Please sign up for a github education account to get free access to these tools: <https://github.com/education/students>. A bonus of using github is that you will have access to GitHub Copilot, an AI coding assistant that can help you write code faster and with less effort.

We will use iClicker software to take attendance at lecture and assess understanding of the material. If you have not already joined the course, you can do so using this link: <https://join.iclicker.com/NBFG>

Course Structure

The course is designed to introduce you to essential data analysis skills as well as effective communication of data insights. The first half of the course will focus on building foundational skills in data acquisition, cleaning, manipulation, and visualization using R. The second half of the course will emphasize applying these skills to real-world problems through projects and presentations.

Lab Assignments

The first part of the course will consist of lab assignments designed to build your skills in R and data analysis.

Exams

There will be a midterm and final exam to assess your understanding of the course material. The exams will focus on concepts covered in the course. These exams will be on paper in class.

Projects

The second part of the course will involve a data analysis project where you will apply the skills learned in class to a real-world problem. You will work in teams to complete the project, which will culminate in a written report and presentation.

Many careers require teamwork in some form. In this course, you will work in teams to complete your assignments and present your work. Team projects will train students to collaborate with peers as they likely will do in the workplace. Group work can also lead to freeriding so, students will evaluate themselves and each other after each project. The evaluation will provide the students the opportunity to explain their contribution and those of their peers. The instructors will be available to resolve disputes within a team. However, the most productive arrangement for this class (and in your future workplace) is to communicate expectations with your colleagues and do your part of the project.

Student Websites

Students will create a website that will serve as a repository for their project. If this is your first time creating a website, I recommend [google sites](#) - a free and easy to use website editing and hosting tool. It will also serve as a record of their work in a presentable format that can be shared within or outside of CSU. *There are many other tools for building and hosting websites. Please come talk to me if you have another option in mind or would like learn a more advanced option.*

Attendance and Participation

There will be iClicker questions incorporated into most lecture materials. These questions are intended to assess understanding of lecture materials and provide the instructors with real-time feedback on comprehension. Responses will account for a small portion of the overall course grade.

I will assign readings throughout the course. These readings may be case studies, book chapters, or articles. You are expected to complete the readings before class and be prepared to discuss them in class. I may randomly call on you to discuss the readings during class. Your participation will contribute to your overall course grade.

Assignments and Grading

Component	Percentage
Lab Assignments	30%
Midterm Exam	30%

Component	Percentage
Data Analysis Project	30%
Participation	10%

Letter grades will be assigned based on the conventional CSU grading scale (93% or more = A, 90% - 92% = A-, 88% - 89% = B+, 83% - 87% = B, 80% - 82% = B-, 78% - 79% = C+, 73% - 77% = C, 70% - 72% = C-, 60% - 69% = D, less than 60% = F)

Course Expectations and Policies

I will communicate with you through your CSU email and through Canvas. Email is the best way to reach me. When many students have the same kind of question, I may reply to the entire class or post documents on the class website.

During class, please limit use of phones and tablets to class-relevant activity. Be respectful of each other and your instructors/TA. Much of the course content will require the use of computers. Please use laptops and lab computers appropriately (do not watch media in class).

AI/LLM Tools

(drafted with the assistance of ChatGPT)

This course encourages the responsible use of modern analytical tools, including artificial intelligence (AI) and large language models (LLMs) such as ChatGPT, GitHub Copilot, and similar systems. These tools are increasingly used in professional data analysis, programming, and decision-making contexts. Learning how to use them critically, transparently, and ethically is an explicit objective of this course.

At the same time, students are expected to demonstrate their own understanding and reasoning. Using AI tools without disclosure, or presenting AI-generated work as your own original work, is not permitted.

Permitted Use

Students may use AI/LLM tools to support their learning, including but not limited to:

- Clarifying concepts (e.g., econometrics, optimization, or data methods)
- Debugging or refactoring code
- Generating example code snippets or pseudocode

- Exploring alternative modeling approaches
- Improving clarity, organization, or grammar in written explanations
- Brainstorming research questions or project ideas

Use of these tools is allowed only if it is fully and transparently documented (see Documentation Requirements below).

Prohibited Use

The following uses are not allowed:

- Submitting AI-generated text, code, analysis, or results without disclosure
- Representing AI-generated work as your own independent work
- Using AI tools to complete assignments in ways that bypass the learning objectives (e.g., generating a full solution when the assignment is designed to assess your ability to construct it)
- Using AI tools during exams or assessments where they are explicitly disallowed
- Fabricating citations, data sources, or empirical results generated by AI

Documentation Requirements

Whenever you use an AI/LLM tool for an assignment, you must include an AI Usage Disclosure. This disclosure should be brief but specific and included at the end of your submission (or in comments for code).

At a minimum, your disclosure must state:

- Which tool(s) you used (e.g., ChatGPT, GitHub Copilot)
- What tasks the tool assisted with (e.g., debugging, drafting, explanation)
- How you modified or evaluated the AI output
- What parts of the work are entirely your own

Example Disclosure (Written Assignment)

AI Usage Disclosure: I used ChatGPT to help clarify the interpretation of regression coefficients and to suggest alternative ways to explain the results in plain language. I revised the explanations substantially and verified all interpretations against course notes and my own analysis. All data processing, model estimation, and conclusions are my own.

Example Disclosure (Coding Assignment) ~~~ # AI Usage Disclosure: # I used GitHub Copilot to suggest syntax for a for-loop and to debug an error # related to missing values. I reviewed, modified, and tested all code. ~~~

Principles of Community

The Principles of Community support the Colorado State University mission and vision of access, research, teaching, service and engagement. A collaborative, and vibrant community is a foundation for learning, critical inquiry, and discovery. Therefore, each member of the CSU community has a responsibility to uphold these principles when engaging with one another and acting on behalf of the University

Inclusion: We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents, and contributions.

Integrity: We are accountable for our actions and will act ethically and honestly in all our interactions. *Respect:* We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.

Service: We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.

Social Justice: We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

Academic Integrity

Academic misconduct (see examples below) undermines the educational experience at Colorado State University, lowers morale by engendering a skeptical attitude about the quality of education, and negatively affects the relationship between students and faculty/instructors.

Faculty/Instructors are expected to use reasonably practical means of preventing and detecting academic misconduct. Any student found responsible for having engaged in academic misconduct will be subject to academic penalty and/or University disciplinary action.

Students are encouraged to positively impact the academic integrity culture of CSU by reporting incidents of academic misconduct.

Examples of academic misconduct include (but are not limited to):

1. Cheating – Cheating includes using unauthorized sources of information and providing or receiving unauthorized assistance on any form of academic work or engaging in any behavior specifically prohibited by the instructor in the course syllabus or class presentation.

2. Plagiarism – Plagiarism includes the copying of language, structure, images, ideas, or thoughts of another, and representing them as one's own without proper acknowledgment, and is related only to work submitted for credit. Also included is the failure to cite sources properly; sources must always be appropriately referenced, whether the source is printed, electronic or spoken.
3. Unauthorized Possession or Disposition of Academic Materials – Unauthorized possession or disposition of academic materials includes the unauthorized selling or purchasing of examinations, term papers, or other academic work; stealing another student's work; and using information from or possessing exams that an instructor did not authorize for release to students.
4. Falsification – Falsification encompasses any untruth, either verbal or written, in one's academic work.
5. Facilitation of any act of Academic Misconduct – Facilitation of any act of academic misconduct includes knowingly assisting another to commit an act of misconduct.

Accommodations

If you require accommodations, contact the Student Disability Center:
<https://disabilitycenter.colostate.edu>, TILT Room 121, (970) 491-6385.