[INFO I-123] Data Fluency

Fall 2025. M/W 15:55 - 17:10, Luddy Hall 0117

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Office Hours: Mondays 11am–12pm, Luddy Hall Room 2002

Course Description

Data is big. Data is everywhere. How can we possibly be expected to keep up in a world full of data, much of which is data about ourselves? This class provides fundamental skills for the 21st century: understanding data, extracting knowledge from data, generating predictions from data, and presenting data.

Associate Instructors

- Anindya Mondal
  - anmondal@iu.edu
  - Fridays 4–5pm
  - Luddy AI building, 2nd Floor Room 2004 or Zoom
- Sri Sai ***Lahari*** Gandrapu
  - sgandrap@iu.edu
  - Wednesdays 2–3pm
  - Zoom (Passcode:wW0Fgm)
- Shruthi Nagappan
  - shrnaga@iu.edu
  - Tuesdays 2-3pm
  - Zoom

Email Policy

Our email policy is to respond within ***48*** hours. Please plan accordingly, as we cannot guarantee a response within just a few hours. Contact us directly via email. **Do not use Canvas messages.**

Learning Goals

This course will prepare you to be an excellent consumer and producer of data. INFO–123 will introduce you to concepts across Informatics and Data Science. Students who successfully complete Data Fluency will be able to:

- Learn **what is data**. Explore the different types of data (e.g., qualitative vs. quantitative, structured vs. unstructured), where data comes from, and how it shapes the world around us, from science and policy to everyday decision-making.
- Learn how to **use** data (design). Know how to use data effectively in design and decision-making. Gain practical skills in formulating questions, collecting and organizing data, and designing data-informed solutions. Emphasis is placed on measurement validity and approaches as well as recognizing limitations.

- Learn how to **interpret** analyzed data by identifying patterns, relationships, and trends. Strengthen analytical thinking using tools such as spreadsheets, visualizations, and statistical methods to uncover insights and avoid common misinterpretations. The goal is to develop the ability to read and interpret quantitative information and make informed decisions based on it.
- Learn how to **communicate** your data analysis (presentation). Practice crafting clear, compelling narratives based on data. Learn how to effectively use charts, dashboards, de-cluttering techniques, and written explanations to convey key insights to both technical and non-technical audiences.

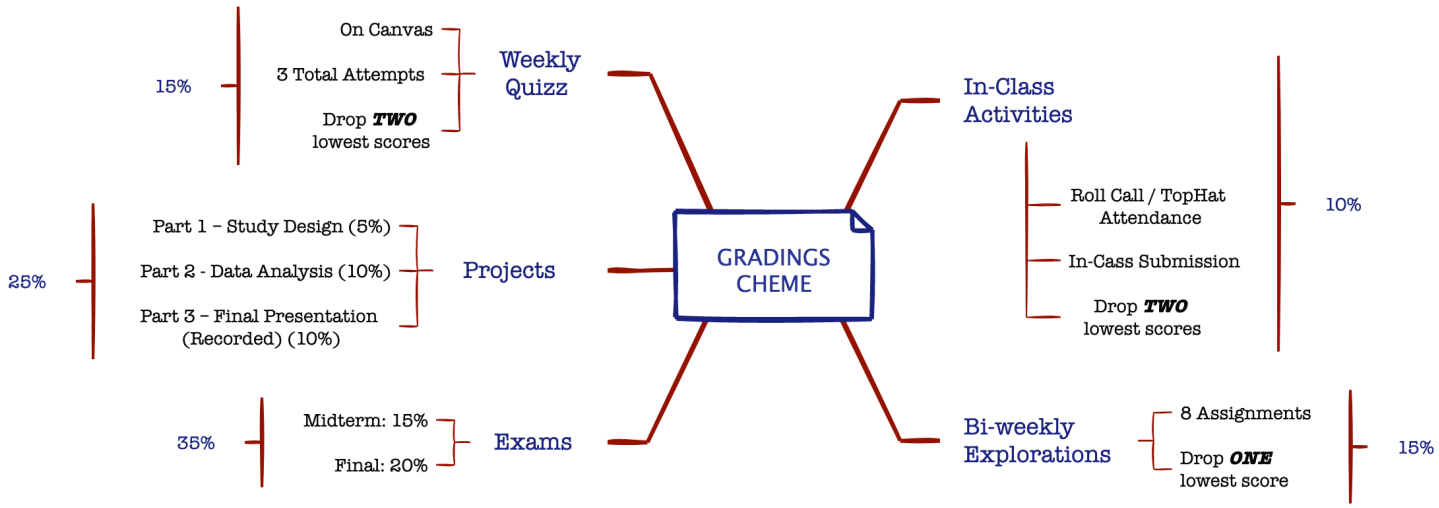
INFO–123 also fulfills the General Education requirement for Natural and Mathematical (NM) Sciences. It fulfills the following General Education Learning Outcomes:

- NM-1. Students demonstrate an understanding of scientific inquiry and the bases for technology
- NM-4. Students demonstrate the ability to solve problems
- NM-5. Students demonstrate analytical and/or quantitative skills

Course Requirements and Grades

You are responsible for:

- Participating In-Class Activities (10%)
- Bi-weekly Exploration Assignments (15%)
- Weekly Online Quizzes (15%)
- Applied Projects (Individual) (25%)
- Exams (35%)



Course Activities in Details

- **Learning**
  You will need to go over the materials for each session before coming to class. Instead of traditional textbooks, most content will be provided as assigned readings or video presentations covering key concepts related to the session's main topic. Make sure to take notes while watching the video lectures, as we will actively apply these concepts during our in-class activities.

- **In-Class Activities**
  For modules that have video lectures is to prepare you the knowledge for our in-person class. They are available on Canvas for you to watch, rewind, pause, speed up, or slow down as best works for you. Our in-person class sessions are opportunities to discuss the knowledge and concepts in details, do practice and engage actively together. As a result, our classes will be highly interactive. To get full credit for class participation, you will need to attend class and actively engage. (Activities will take the form of short written reflection, responding to questions live through TopHat, group discussions, and more. You don't need to be a frequent talker or hand-raiser to get full points.) The 2 lowest participation grades will be dropped before your course grade is computed.
- **Weekly Quizzes**
  Each week, a quiz will be posted on Canvas following Wednesday's class. You will have up to three total attempts (including your first attempt), and the questions will be based on the content covered in class. Quizzes are due by ****Sunday at 11:59 PM**** Eastern Time of the same week, giving you four days to complete them. Late submissions are not accepted unless excused. The 2 lowest grades will be dropped before your course grade is computed.
- **Bi-weekly Explorations**
  Biweekly, you will complete an Exploration by submiiting your works onto Canvas. The Explorations apply concepts we are covering in the learning materials and class lessons. The Explorations are designed to make the concepts more concrete to help students learn. Use your own words for all written submissions. Do not quote or copy someone else's words or work. We will drop your lowest Exploration grade. Explorations are due by ****Sunday 11:59 PM****. All Explorations have an automatic 1-day extension. Late submission penalty will be applied unless excused. The 1 lowest grades will be dropped before your course grade is computed.
- **Projects**
  The applied projects offer you an opportunity to put into practice the skills and knowledge gained throughout the semester. It is designed to (1) guide you through the key steps of planning and executing a data-driven project, (2) give you the chance to explore a research topic that interests you, and (3) provide flexibility and autonomy in shaping your own project. There will be multiple deliverables due over the course of the semester, culminating in a final recorded presentation. You will have approximately two weeks to complete each stage of the project. Late submissions will incur a penalty unless it is excused.
- **Exams**
  The midterm and final exams will each cover approximately eight weeks of course material. Weekly quizzes, exploration assignments, and regular review of course content will help you prepare for the types of questions you'll encounter on the exams.

Note on dropping lowest scores: We will drop the lowest Exploration score, 2 lowest Quiz scores, and 2 lowest In-Class Activities scores. Don't plan to skip the first assignments. This safety net is meant for unexpected situations later in the semester. If you miss work early on, you may not have the flexibility to use this policy when you truly need it.

Tools we'll be using

- Windows **or** macOS
- Microsoft Office 365 (**Desktop Version!**) (https://iuware.iu.edu/Mac/List/1/Titles/20)
- TopHat (Find it in the Canvas sidebar)
- `R` and `RStudio Desktop` (https://posit.co/download/rstudio-desktop)
- Tableau (https://www.tableau.com/products/public/download)
- Teachable Machine (https://teachablemachine.withgoogle.com)

Note: This list may be updated as the semester progresses.

Tech Resources

- **UITS Tech Support:** Available 24/7 to assist with any tech issues.
- **Canvas Student Guide:** Step-by-step guidance on how to use Canvas effectively.
- **IU Knowledge Base:** A searchable resource for answers to a wide range of tech questions at IU.

Other Important Information

- **In the event of illness and/or quarantine** - In-person class sessions will be taped. If you are ill or quarantined, you may still earn In-Class Activity points by watching the video recording of class, typing out your response to in-class questions and activities, and sending it to the instructor team. Class recordings are NOT meant to be a regular replacement for in-person class, but rather to help students in the event of illness or quarantine.
- **Expectations**
  - If you are unable to attend class, complete work, or participate for reasons of health, family responsibilities, or religious holidays, please contact the instructors (in advance, if possible) to make arrangements. Remember that you can turn in any assignments early if you anticipate a conflict.
  - Students and instructors should maintain a high standard of respect and courtesy towards others.
  - If you are having difficulty in this class and need extra help, please contact us before you fall behind. It is much easier to keep up than to catch up.
- **Accessibility & Accommodation** - Indiana University is dedicated to ensuring that students with disabilities (e.g., chronic health, neurodevelopmental, neurological, sensory, psychological & emotional, including mental health, etc.) have the support services and reasonable accommodations needed to provide equal access to academic programs.

  To request an accommodation, you must establish your eligibility by working with Disability Services for Students (iubdss@indiana.edu or 812-855-7578). Additional information can be found at accessibility.iu.edu. Note that services are confidential, may take time to put into place, and are not retroactive; captions and alternate media for print materials may take three or more weeks to get produced. Please contact your campus office as soon as possible if accommodations are needed.
- **Dates -** For important dates (drop, withdraw with automatic W, withdraw with Dean's approval) see the Official Calendar from the Registrar
- **Academic Integrity -** As a student at IU, you are expected to adhere to the standards and policies detailed in the Code of Student Rights, Responsibilities, and Conduct. When you submit an assignment with your name on it, you are signifying that the work contained therein is all yours, unless otherwise cited or referenced. Any ideas

or materials taken from another source for either written or oral use must be fully acknowledged. If you are unsure about the expectations for completing an assignment or taking a quiz or exam, be sure to seek clarification beforehand. All suspected violations of the Code will be handled according to University policies. Sanctions for academic misconduct may include a failing grade on the assignment, reduction in your final course grade, or a failing grade in the course, among other possibilities, and **must include a report to the Dean of Students** who may impose additional disciplinary sanctions, including mandatory attendance at a workshop to be sure you understand plagiarism

- **Title IX and Sexual Misconduct** - As your instructor, one of my responsibilities is to create a positive learning environment for all students. IU policy prohibits sexual misconduct in any form, including sexual harassment, sexual assault, stalking, sexual exploitation, and dating and domestic violence. If you have experienced sexual misconduct, or know someone who has, the University can help. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with the IU Sexual Assault Crisis Services at (812) 855-5711, or contact a Confidential Victim Advocate at (812) 856-2469 or cva@indiana.edu.

  It is also important that you know that University policy requires me to share certain information brought to my attention about potential sexual misconduct, with the campus Deputy Sexual Misconduct & Title IX Coordinator or the University Sexual Misconduct & Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist. I encourage you to visit http://stopsexualviolence.iu.edu/index.html to learn more.
- **Bias Incident Reporting -** Bias-based incident reports can be made by students, faculty and staff. Any act of discrimination or harassment based on race, ethnicity, religious affiliation, gender, gender identity, sexual orientation or disability can be reported (can be made anonymously) through any of the options:
  - Fill out an online report at https://reportincident.iu.edu
  - Call the Dean of Students Office at (812) 855-8187
- **Extra Credit -** No extra credit will be awarded for the class. Your best strategy is to keep up with the learning materials, in-person lessons, explorations, and quizzes from the beginning. If you fall behind, it will be difficult to complete enough work to pass the class.

Course Calendar

This the *tentative* schedule of dates, topics and assignments. Topics and dates are subject to change.

Week	Date	Topics	Assignments	Theme
1	Aug 25	Introduction & All Things Data		**What is Data?**
	Aug 27	Privacy & Ethics	Exploration–1, Weekly Quiz	
2	*Sep 01*	*Labor Day (No class)*		
	Sep 03	Research Design–1	Weekly Quiz	
3	Sep 08	Research Design–2	Exploration–2	
	Sep 10	Data Collection–1 (Asynchronous – watch recorded lecture)	Weekly Quiz	**Using Data**
4	Sep 15	Data Collection–2 (Asynchronous – watch recorded lecture)		
	Sep 17	Analysis Tools: `Excel` (Part 1)	Exploration–3, Weekly Quiz	
5	Sep 22	Analysis Tools: `R` (Part 1)		
	Sep 24	Descriptive Statistics–1	Weekly Quiz	**Interpretation**
6	Sep 29	Descriptive Statistics–2		
	Oct 01	`Excel` (Part 2), `R` (Part 2)	Exploration–4, Weekly Quiz, **Project–1**	
7	Oct 06	Statistical Relationship–1		
	Oct 08	Statistical Relationship–2	Weekly Quiz	
Fall Break – Oct 10–12				
8	Oct 13	`Excel` (Part 3)		
	Oct 15	`R` (Part 3)	Exploration–5, Weekly Quiz, **Project–1 (Due)**	
9	Oct 20	***Midterm Exam***		
	Oct 22	Networks–1		

10	Oct 27	Networks–2		
	Oct 29	R (Part 4)	Exploration–6, Weekly Quiz	
11	Nov 03	Algorithm		
	Nov 05	Machine Learning–1	Weekly Quiz, **Project–2**	
12	Nov 10	Machine Learning–2		
	Nov 12	Designing Visualizations–1	Exploration–7, Weekly Quiz	**Communication**
13	Nov 17	Designing Visualizations–2		
	Nov 19	Storytelling with Data–1	**Project–2 (Due, 11/21)**	
Thanksgiving Break – Nov 23–30				
14	Dec 01	Storytelling with Data–2	**Project–3**	
	Dec 03	Relational Diagrams	Exploration–8, Weekly Quiz	
15	Dec 08	Visualization using Excel and R		
	Dec 10	Tableau	Weekly Quiz	
16	Dec 15	No Class		**Final Exam Week**
	Dec 17	No Class		
	Dec 19	***Final Exam***	**Project–3 (Due)**	

NOTE: The dates listed above are subject to change based on course needs. Finalized dates and detailed instructions will be posted on the course website.