Introduction to Data Analytics

DANA 100-801 (Fall 2025)

Instructor Info

Dr. Faezeh Soleimani (She/Her)
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My BSU Profile

Course Info

Format: Asynchronous Online

Important Note

I only check my emails from 8 am - 5 pm on weekdays (Mon-Fri) and it may take up to 48 hours to respond to your emails.

In your email, please include the course name/number (DANA 100-801).

I will use Zoom to hold online meetings and office hours for the class.

Overview and Course Description

This course provides a foundational understanding of key components in the realm of data analytics, covering historical perspectives, ethical considerations, and essential technical skills. Students will explore major data types, analytic environments, computing principles, and statistical methods, laying the groundwork for proficiency in contemporary data analysis. Through a curated selection of topics, including data visualization, text mining, and machine learning, students will acquire a versatile skill set that aligns with current industry demands. The course culminates with an exploration of cutting-edge areas such as network analysis and big data analytics, ensuring learners are well-equipped for the dynamic landscape of data-driven decision-making.

Recommended Background

A solid foundation in high school math is expected.

Textbook & Technology

Recommended Textbooks

- Kelleher, John D. and Brendan Tierney. 2018. Data Science. Cambridge, MA: The MIT Press.
- Wickham, Hadley and Garrett Grolemund. 2017. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data. Sebastopol, CA: O'Reilly Media.

Other References

- Grus, Joel. 2019. Data Science from Scratch: First Principles with Python. 2nd Ed. Sebastopol, CA: O'Reilly Media.
- VanderPlas, Jake. 2016. Python Data Science Handbook: Essential Tools for Working with Data. Sebastopol, CA: O'Reilly Media.

Technology

In this course R programming language will be used.

Course Objectives

Students will be able to:

- describe the evolution and domain areas of data analytics,
- critically evaluate the philosophy and ethics for data analytics,
- use, process, and explore real-world data, and apply elementary-level data analytics techniques such as data mining, data visualization, and machine learning,
- perform basic skills in computing and statistical programming.

Course Rationale

Data analytics is an interdisciplinary science, and thus it requires not only depth but also breath of knowledge in storing, processing, analyzing, predicting and theorizing data. In this course, students will learn both the principles of data science and rudimentary skills in analyzing various forms of modern data.

Attendance Policy

Given the asynchronous online format of the course, attendance is NOT obligatory. Nevertheless, to enhance your academic success, it is crucial that you organize your schedule to allocate 2-3 hours per week for coursework for each credit you are enrolled in.

Grading Scheme

20%	Homework: Homework will be assigned every week with some exceptions. Please make sure to complete the assignments by the specified deadline. The deadlines are scheduled for Sundays at 11:59 pm (EST).
20%	Quizzes: There will be four online quizzes covering sections done on previous homework assignments.
10%	Discussion Broads: There will be ten discussion board.
20%	Midterm Project: A midterm project is scheduled to take place during a two-week period.
30%	Final Project: A final project is scheduled to take place during a three-week period.

Important Note

Students are responsible for all material submitted correctly for assignments. Please make sure you submit the correct and readable version of your documents.

Grade Categories and Weights

[93, 100]	A
[90,93)	A-
[87,90)	B+
[83,87)	B
[80,83)	B-
[77,80)	C+
[73,77)	C
[70,73)	C-
[67,70)	D+
[63,67)	D
[60,63)	D-
[0,60)	F

Late Submissions & Make-up Policy

- Homework: HW assignments will NOT be accepted late, but the 2 lowest grades will be dropped.
- Discussion Boards: No late submission is allowed.
- Quizzes & Projects: Make-up quizzes and projects (just for the midterm project) will NOT be given unless you have a very serious reason. Also, you must contact me beforehand to get approval. Documentation is required!

Technical Information

It is your responsibility to become familiar with the class interface and seek help if necessary. BSU provides resources to help you. A lack of Canvas knowledge is not an acceptable excuse for late or incomplete work.

- Technical Equipment: For you to be successful in this type of course (e.g. hybrid delivery, flexible delivery), access to the internet is essential. Consult with Ball State Online Division at 765-285-1581 or this link.
- Technical Assistance: If you have technical questions, you can contact Ball State's Help desk. The helpdesk can be contacted at 765-285-1517 (Toll-Free 866-771-3276) or at this link. Hours of Operation: Monday-Thursday: 7:30am to 7:00pm & Friday: 7:30am-5pm
- For Canvas-related issues, click the Help icon in the lower-left corner of your Canvas screen. It looks like a question mark. In the populated list, you will see links for contacting Canvas 24/7 via chat or phone, as well as a quick orientation on how to use Canvas for discussion boards, quizzes, and assignments in your classes.

Course Withdrawal

The course withdrawal period ends on October 27th, 2025. Before this date, students can elect to receive a "W" for the course by completing and submitting the proper form. The instructor's permission is not required. For details, see this link as well as Degree Requirements and Time Limits in the current Undergraduate Catalog OR Withdrawal Procedures in the current graduate catalog.

University Statement

We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse. If you need course adaptations or accommodations because of a disability, please contact me as soon as possible. Ball State's Disability Services office coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

Freedom of Expression

In this course, we are committed to fostering a learning environment that values intellectual diversity, encourages free expression, and promotes open inquiry. As members of the Ball State Community, we treat each person in the Ball State community with civility, courtesy, compassion, and dignity and respect and learn from differences in people, ideas, and opinions. Please review Ball State University's Statement on Freedom of Expression, the resources on Ball State's Freedom of Expression webpage, and Ball State's Beneficence Pledge.

Academic Honesty

Ball State's Academic Ethics Policy is given here. Violating this policy can lead to disciplinary action up to and including expulsion from the university. Ball State's Code of Student Rights and Responsibilities is given here.

Student Academic Ethics Policy

See this link.

Code of Student Rights and Responsibilities

See this link.

Course Schedule

Please note that assignment dates are tentative and subject to change at instructor's discretion.

Weeks	Topics	Assignments
W 1: 08/18-08/22	The History and Evolution of Data Analytics	• Review Course Expectations/Policies Module • Complete Class Overview Module • Read Lecture 1 • Watch Lecture Video 1 • Complete HW 1 • Complete Discussion Board 1
W 2: 08/25-08/29	Philosophy and Ethics of Data Analytics	• Read Lecture 2 • Read Chapter 6 (Privacy and Ethics) from Data Science textbook (Keller and Brendan) • Watch Lecture Video 2 • Complete HW 2 • Complete Discussion Board 2
W 3: 09/02-09/05	Major Data Types-Part 1	• Read Lecture 3 • Watch Lecture Video 3 • Complete HW 3 • Complete Discussion Board 3 • Take Quiz 1 (Wednesday September 3rd)
W 4: 09/08-09/12	Major Data Types-Part 2	• Read Lecture 4 • Watch Lecture Video 4 • Complete HW 4
W 5: 09/15-09/19	Major Data Analytics Environments	• Read Lecture 5 • Watch Lecture Video 5 • Complete HW 5 • Complete Discussion Board 4
W 6: 09/22-09/26	Descriptive Statistics-Part 1	• Read Lecture 6 • Watch Lecture Video 6 • Complete HW 6 • Complete Discussion Board 5 • Take Quiz 2 (Wednesday September 24th)
W 7: 09/29-10/03	Descriptive Statistics-Part 2	• Read Lecture 7 • Watch Lecture Video 7 • Complete HW 7
W 8: 10/08-10/10	Principles of Computing and Programming-Part 1	• Read Lecture 8 • Review Chapter 27 from Hadley Wickham and Garrett Grolemund's book • Review R Markdown cheatsheet from RStudio • Watch Lecture Video 8 • Complete HW 8 • Complete Discussion Board 6

Weeks	Topics	Assignments
W 9: 10/13-10/17	Principles of Computing and Programming-Part 2	• Read Lecture 9 • Watch Lecture Video 9 • Start the midterm project (Monday October 13th)
W 10: 10/20-10/24	Data Visualization	• Read Lecture 10 • Watch Lecture Video 10 • Complete Discussion Board 7 • Complete the midterm project (Sunday October 26th)
W 11: 10/27-10/31	Data Mining/Explanatory Data Analysis-Part 1	• Read Lecture 11 • Watch Lecture Video 11 • Complete HW 9 • Complete Discussion Board 8
W 12: 11/03-11/07	Data Mining/Explanatory Data Analysis-Part 2	• Read Lecture 12 • Review Data visualization with ggplot2 cheat-sheet • Review Reading files/dataset • Review Installing and loading packages in R • Watch Lecture Video 12 • Complete HW 10 • Take Quiz 3 (Wednesday November 5th)
W 13: 11/10-11/14	Machine Learning (Unsupervised Learning)	• Read Lecture 13 • Watch Lecture Video 13 • Complete HW 11 • Complete Discussion Board 9
W 14: 11/17-11/21	Machine Learning (Supervised Learning)	• Read Lecture 14 • Watch Lecture Video 14 • Complete HW 12 • Complete Discussion Board 10 • Start the Final project (Monday November 17th)
W 15: 11/24-11/28	No Lecture	• No Homework
W 16: 12/01-12/05	Network Analysis	• Read Lecture 15 • Watch Lecture Video 15 • Take Quiz 4 (Wednesday December 3rd) • Complete the Final project (Sunday December 7th)
W 17: 12/08-12/08	No Lecture	• No Homework

Important Dates

Please note that Assignment dates are tentative and subject to change at instructor's discretion.

First Day of Classes	August 18, 2025
Labor Day	September 1, 2025 (No Classes)
Quiz 1	September 3rd, 2025
Quiz 2	September 24th, 2025
Fall Break	October 6th – 7th, 2025 (No Classes)
Midterm Project	October 13th – 26th, 2025
Withdrawal Deadline	October 27th, 2025 (By 11:59 PM)
Quiz 3	November 5th, 2025
Thanksgiving	November 26th - 30th, 2025 (No Classes)
Final Project	November 17th – December 7th, 2025
Quiz 4	December 3rd, 2025
Last Day of Classes	December 8th, 2025