

Syllabus (Not Yet Finalized)

LIS 440:

Navigating the Data Revolution:

Concepts of Data and Information Sciences

Instructor: Dr. Jeff Nyhoff

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Course Meeting Times and Location:

- Fall 2025, September 3 to December 10.
- In person, Tuesdays and Thursdays, 4:00pm-5:15pm, Chamberlin Hall 1295.
- **In-person attendance is required at all sessions.**
- **There is no in-person final exam for this course.**

Official Catalog Course Description of LIS 440:

Provides an introduction to the world of Data Science. Includes hands-on projects using scenarios involving analysis of real-world data and development of graphical visualizations. Introduces statistical tests, data management, data programming, data ethics, and visualization of data.

Prerequisites and corequisites

- Quantitative Reasoning Part A
- Communications A
- Sophomore standing

Course attributes

- Gen Ed - Quantitative Reasoning Part B
- Breadth - Natural Science
- Level: Intermediate
- Liberal Arts and Science credit

Official Learning Outcomes Designated for LIS 440

Upon completing this course, students will be able to:

- Articulate goals, tools, and methods commonly used in data analytics and data science;
- Select appropriate approaches for different types of questions posed by data;
- Use a variety of computer software tools to analyze data and find insights regarding high-level questions posed by the data;
- Communicate insights and data limitations resulting from data analysis in written, spoken, and visual form, clearly and persuasively;
- Identify statistical patterns and employ statistical tools to analyze data and model aspects of the real-life phenomena producing that data.
- Use computer software tools to generate and use data visualizations.
- Undertake a data project related to a current, real-world problem, including the identification of problematic ethical considerations and competing interests related to that problem.

Required Course Materials

- **Windows or Mac laptop computer, brought to each class period.**
- Laptop must be sufficiently **CHARGED** at the beginning of the class period to enable it to operate on battery for the entire hour.

Typical Weekly Schedule in LIS 440:

- **Each Day (In class)**
 - **Lecture-Demo** (work along with the professor, submit results at end of class) and/or **In-class exercises.**
- **Before Next Class (outside-class)**
 - **Continued Exercises** building upon **in-class work.**

Course Outline

Each week or two, we will typically complete one "module."

Modules in this Course:

- **Getting Started (Week 1)**
- **Digital, Data, and Computation Basics**
- **Data in Table Form**
- **Statistical Functions**
- **Data Analytics with Python/Pandas**
- **Databases with SQLite**
- **Data Visualization**

- **Summary Data Project**

About Each Module

- In each of the course modules, we will typically start by learning the key concepts and operations in **Excel**.
 - I will review basic Excel concepts and provide to you a more solid and cohesive way to think about and work with Excel.
 - You will be pleasantly surprised by what Excel can do that you probably have not seen before!
- Afterward, we learn how to perform some the same and additional operations and explorations by writing **code**.
 - For this, we will use a very friendly coding environment named "**Thonny**" to do our coding.
 - Our fundamental coding will be in **Python**.
 - Python is a programming language that is very friendly to beginners.
 - Python is also a very versatile and powerful programming language, so it is a very useful thing to take a peek at in this course
 - It's a great thing to be able to put on your resume!
 - I will gently and patiently introduce to you the Python you will need for this course.
 - I do not expect you to have any prior experience with coding.
 - If you do have prior experience, that's fine, too.
 - Everyone in this course will get to learn some new things!
 - We will primarily be using a Python "library" known as **Pandas** that is widely use today for data work.
 - This will include:
 - downloading and reading in data
 - organizing data into tables,
 - performing calculations, sorting, and summarizing operations on data
 - asking questions about what our data is showing
 - making graphs and visualizations to look for trends visually
 - Again, because our examples will first be undertaken in **Excel** spreadsheets, it will feel to you that you are doing work that is already familiar to you: you will be achieving the same results with **Python/Pandas** code instead of Excel formulas and functions.
 - Interestingly, Microsoft has recently added the ability to put **Python code** inside **Excel**!

HOW THIS COURSE WORKS

****IMPORTANT: The way I teach this course works in a different way than most other courses, so please take careful note of the following!****

Types of Coursework

- The work of this course consists of **dozens of relatively short assignments** over the course of the semester.
- There are **several types of student coursework** required in this course:
 - **In-Class Activities**
 - Attendance
 - Lecture-Demos
 - In-Class Exercises
 - **Outside-Class Activities**

IN-CLASS ACTIVITIES:

- **Attendance of Session**
 - **Attendance** will be taken at every session at the beginning of class using **TopHat**.
 - **Points** are awarded each session for attending.
 - These points are awarded for several reasons, including the following:
 - For college-level learning, there is usually no real substitute for attending class in person, and this is certainly true for this course.
 - Each student's presence and participation in a class session has the potential to enrich the learning experience for each other student in attendance as well.
 - "Attendance" entails attending to what is going on in class. Thus, performing activities unrelated to the course such as work for another course, unrelated web surfing emailing, computer gaming, etc., during class time will result in a loss of attendance points. Part of the reason for this policy is that such activities can be greatly distracting to other students in the class session.
 - Use of cell phones during class time is not permitted unless required for an activity.
 - Attendance points may be deducted for missing a significant portion of the class session without permission of the instructor.
 - Attendance points may be deducted for not bringing your laptop or other required course materials or information to class.
 - **Remember to sign-in for attendance!**
 - "I was there, but I forgot to sign in..." will not be an accepted excuse...
 - **It is very simple to get all of the attendance points:**
 - arrive to class on **time**;

- sign-in to **TopHat** at the beginning of class;
- be involved in **what is going on in class**;
- perform the **in-class activities**;
- refrain from doing **work for other classes (etc.) during class time**;
- refrain from using **mobile phones** during class (except to perform Duo authentication);
- refrain from **sleeping in class**;
- refrain from using **earbuds or headphones** during class.
- These are simple small things, and they contribute greatly to creating a classroom environment that is enjoyable and conducive to learning for all!
- Forgetting to do any of these may result in an unfortunate and unnecessary **loss of attendance points**...

- **RECORDING**

- Lecture-Demos will not be recorded.
- Students are not permitted to record video or audio or take videos during class sessions.

- **CAUTION**

- Signing in and /or submitting in-class work for any student other than yourself constitutes academic dishonesty and will be handled according.

- **Lecture-Demos**

- These are combinations of **lecture** and **demonstration** by the professor during class time.
- Students are required to follow along:
 - performing the same (or closely comparable) computations/coding as the professor
 - making sure it executes properly,
 - making sure it produces correct results.
- Throughout the lecture-demo, the professor will periodically guide students through copying the computational work and output and adding it to a word processing document acting as a record for that session's lecture-demo.
- If the student submission is complete and fairly close to the professor's lecture-demo, then full credit is awarded.
- **At the end of the lecture-demo, each student must upload this document via Canvas before the set deadline, before leaving the classroom.**
- **Note: Lecture-demos cannot be made up if a student is not in the class session, even in the case of an excused absence.**
- **Remember to submit your Lecture-Demo DURING CLASS TIME and before the deadline!**
 - "I did it, but I forgot to submit it..." will not be an accepted excuse...

• **In-class Exercises**

- Class sessions will sometimes include the opportunity to perform one or more exercises that follow up on concepts and techniques introduced during the lecture-demo and help prepare for outside-class exercises.
- These are computational exercises that each student completes during class time and submits before leaving.
- The professor and TA will be in the classroom and available to help with these exercises.
- Lab exercises are to be completed during class time and submitted by the end of class time, even if not all of the exercises were completed. In some cases, permission may be given to complete remaining exercises outside the class period.
- **Remember to submit your Lab Exercises DURING CLASS TIME and before the deadline!**
 - "I did it, but I forgot to submit it..." will not be an accepted excuse...

Absences:

- In-class work cannot be made up outside class, even in the case of an excused absence.
- In addition, **if a student misses class, it is that student's responsibility to learning any missed material on their own, outside class.**
 - **This includes:**
 - reading through the slides and or other materials posted in Canvas for that class session
 - doing your best to learn the concepts and information introduced
 - doing your best to perform the in-class computation work that was missed.
 - **Why it is very important that you do this:**
 - The in-class material in this course commonly provides key preparation for subsequent outside-class work and for material/activities that appear later in the course.
 - **NOTE:**
 - **Office hours** for the TA or Professor are **not available to teach material from a missed class.**
 - If you are having trouble understanding the work you missed, then you can try:
 - seeking the help of classmate
 - hiring a tutor

OUTSIDE-CLASS ACTIVITIES:

- **In-Class Exercise Continuation and/or Outside-Class Exercise Work**

- There will typically be a set of exercises that are typically introduced during a class session but that students will need to do outside-class work to complete.
 - These are **exercises** that continue and building upon the concepts and techniques already introduced in the lecture-demo and/or in-class exercises but require students to do a bit more integration and application of those concepts.
 - Each set of exercises typically has a gently rising degree of difficulty, starting with quite simple programming exercises and progressing toward ones that are a bit more challenging.
- **Reading-Viewing-Response**
 - These are **exercises** that involve some online reading and/or video viewing, followed by some short **writing** in response.
 - These exercises will introduce key **concepts** in computing and/or connect our use of computers to **societal issues**.
 - **Quizzes**
 - If, at a point in the semester, the professor decides that a quiz would be beneficial to student learning, then any such quiz will be announced in advance and will simply take the place of some portion of lab work that would have been assigned.
 - **Summary Project**
 - Over the course of the semester, you will be working with a real-world data set that is assigned to you.
 - At several points in the semester, you will do some work with this data.
 - At the end of the semester, you will do some reflection upon this work as our last coursework item.

Late Work

- **After the introductory phase of the course**, while students are still in the process of getting familiar with the rhythm and structure of this course, **late work will not be accepted**.
- **There are several reasons for this:**
 - **This course is designed in such a way as to:**
 - **maximize the use of in-class time together** so that assessments such as quizzes and tests and exams are less valuable than student opportunities to learn and demonstrate their learning **during class time**;
 - **leverage a significant number of smaller assignments** that enable incremental learning and are easier to manage than large projects.

- Because of the large number of exercises and the way the Canvas learning management system operates, it has been very clear from prior experiences with this course design that routinely reopening assignments for late submission, etc., has a **significant adverse impact upon the availability instructor and teaching assistants to provide the most important forms of support for student learning.**
- **The good news is this:** there are **so many points available in this course** that, missing points for one or a few assignments that you were too late to submit is **unlikely to affect your final course grade!**

Illness

- While I certainly know well that illnesses and injuries can interfere with coursework! This happens to students and professors alike!
- However, I am in no position to evaluate whether or not it is medically reasonable for a student to come to class. That's the role of a medical professional.

Unforeseen Life Events

- While I know well how challenging college studies can be, especially when unforeseen personal matters arise, and my heart and sympathy goes out to students when they do, my appropriate role in such situations is limited to the educational experience of the course.
- Students experiencing unexpected life events that are interfering with their ability to attend this and/or any other class sessions are strongly encouraged to contact the **UW Office of Student Assistance and Support** (<https://osas.wisc.edu/student-assistance/>).
- These are trained and experienced experts who are well positioned to help students manage the conflicts between life inside and outside the classroom!

Accommodations

- Special arrangements for accommodations via the UW McBurney Center will be full honored in this course.
- **Without an official accommodation, course requirements (e.g., deadlines) cannot be changed for an individual student in this course.**
- **UW Policy:**
 - **Accommodations for Students with Disabilities**
(<https://guide.wisc.edu/courses/#SyllabusAccommodations>)

Grading

- All coursework is assigned a point value.
- The professor, TA, and/or grader will seek to post all of these points into Canvas promptly so that, at any given point in the semester, each student can see just how well they are doing in the course so far.
- All work is assigned **points**.
- There are literally **thousands of points** in this course.

Submitting Work

- All work will be submitted through **Canvas**.

Grading Scale

The grading scale will be no stricter than the following:

- **90-100% A**
- **84-89% AB**
- **77-83% B**
- **70-76% BC**
- **60-69% C**
- **50-59% D**
- **Below 50% F**

Coursework Weighting

The distribution of points regarding the types of coursework will be approximately the following:

- **In-Class: Attendance and Participation – 10%**
- **In-Class: Lecture-Demos, In-Class Exercises, and other in-class activities – 55%**
- **Outside-Class: Exercises, Reading-Viewing-Responding, Summary Project – 35%**

Grace Points

There will typically be "grace points" added to each student's total at the end of the class, for several reasons:

- grading is not an exact science;
- teaching is not an exact science;
- in my experience, students typically put even more into their learning in my courses than their point totals reflect;
- extenuating student life circumstances often arise that I am not aware of;
- if a student is very close to the "line" for the next-highest grade, I would like to "round up" to benefit that student.

Extra Credit

- A small extra credit assignment **might** be added to the course during the semester.

Academic Integrity

- Read and understand UW's [Academic Integrity Statement](https://guide.wisc.edu/courses/#SyllabusAcademicIntegrity) (<https://guide.wisc.edu/courses/#SyllabusAcademicIntegrity>).
- **Professor Nyhoff's additional comments and advice:**
 - Collaboration and sharing ideas can be helpful in computer programming.
 - However, straight copying of another student's code constitutes plagiarism, unless it has been authorized by the instructor.
 - Doing your own coursework requires, at the very least, that you are seated at your own computer, typing in code, and performing any other necessary software manipulations yourself.
 - Copying another student's computer work constitutes academic dishonesty and will be handled accordingly.
 - Resist the temptation to rely on a classmate's work or to allow a classmate to copy your work. Such copying can result in, at minimum, a failing grade on the assignment for all parties involved.
 - Resist the temptation to copy online solutions
 - As faculty, we are duty-bound to report violations, and it is the worst part of our job as professors.
 - Violations can negatively impact a student's academic record, result in probation, or lead ultimately to dismissal from the university.
 - Such violations can also permanently mar a student's academic reputation as a UW student, potentially affecting their life not only at UW but also beyond.
 - It's simply not worth it.

- If you fall behind in this class, contact me. We can decide together what the best course of action is for you and is in your best interest.
- **UW Academic Integrity Policy:**
 - [Academic Integrity Statement](https://guide.wisc.edu/courses/#SyllabusAcademicIntegrity)
(<https://guide.wisc.edu/courses/#SyllabusAcademicIntegrity>)
- **CAUTION**
 - Signing in and/or submitting in-class work for any student other than yourself constitutes **academic dishonesty** and will be handled according.

Other Important UW Institutional academic policies and statements

- [Teaching and Learning Data Transparency Statement](https://guide.wisc.edu/courses/#SyllabusTLData)
(<https://guide.wisc.edu/courses/#SyllabusTLData>)
- [Privacy of Student Records and the Use of Audio Recorded Lectures Statement](https://guide.wisc.edu/courses/#SyllabusFERPA)
(<https://guide.wisc.edu/courses/#SyllabusFERPA>)
- [Campus Resources for Academic Success](https://guide.wisc.edu/courses/#SyllabusCampusResources)
(<https://guide.wisc.edu/courses/#SyllabusCampusResources>)
- [Course Evaluations](https://guide.wisc.edu/courses/#SyllabusCourseEvals) (<https://guide.wisc.edu/courses/#SyllabusCourseEvals>) and [Digital Course Evaluations](https://guide.wisc.edu/courses/#SyllabusDigitalCourseEval) (<https://guide.wisc.edu/courses/#SyllabusDigitalCourseEval>)
- [Students' Rules, Rights and Responsibilities](https://guide.wisc.edu/courses/#SyllabusStudentsRightsResponsibilities)
(<https://guide.wisc.edu/courses/#SyllabusStudentsRightsResponsibilities>)
- [Diversity and Inclusion Statement](https://guide.wisc.edu/courses/#SyllabusDiversityInclusion) (<https://guide.wisc.edu/courses/#SyllabusDiversityInclusion>)
- [Academic Integrity Statement](https://guide.wisc.edu/courses/#SyllabusAcademicIntegrity) (<https://guide.wisc.edu/courses/#SyllabusAcademicIntegrity>)
- [Accommodations for Students with Disabilities](https://guide.wisc.edu/courses/#SyllabusAccommodations)
(<https://guide.wisc.edu/courses/#SyllabusAccommodations>)
- [Academic Calendar and Religious Observances](https://guide.wisc.edu/courses/#SyllabusCalendarReligiousObservances)
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