

INFO 523 Syllabus Fall 2025

Course description

INFO 523 Data Mining and Discovery- This course will introduce students to the concepts and techniques of data mining for knowledge discovery. It includes methods developed in the fields of statistics, large-scale data analytics, machine learning, pattern recognition, database technology and artificial intelligence for automatic or semi-automatic analysis of large quantities of data to extract previously unknown patterns. Topics include understanding varieties of data, data preprocessing, classification, association and correlation rule analysis, cluster analysis, outlier detection, and data mining trends and research frontiers. We will use software packages for data mining, explaining the underlying algorithms and their use and limitations. The course include laboratory exercises, with data mining case studies using data from many different resources.

Course Offering

47918-52212 INFO 523 101/201 - Data Mining and Discovery

Instructor Information

John Chen,

Lecturer,

College of Information Science

johnchen@arizona.edu

Office: Harvill 304

Office Hours: Wednesdays, 12-1pm, Zoom

Prerequisites

Students are assumed to know the basics in computer programming (e.g., variables, arrays, loops, if-then conditions), statistics (e.g., normal distribution, significance tests), and relational database (e.g., ER-diagram, SQL statements). ## Course Format

Asynchronous online lectures: Monday, Thursday (At Your Pace), Online, Asynchronous. Set your own schedule to watch the lecture videos, but make sure to turn in your assignments and projects on time.

Course Objective

INFO 523 is a required course in the College of Information Science's M.S. program. As a multidisciplinary field, the course introduce concepts and work from many areas critical to information studies including statistics, machine learning, pattern recognition, database technology, and data visualization.

Learning Outcomes

By the end of this course, students will:

- Understand a large set of concepts of data mining and knowledge discovery.
- Evaluate and use algorithms and software packages to perform data mining analyses.
- Explain and interpret results from data mining analyses.
- (Optional) Exploring the usage of Generative AI in and for data mining.

Textbooks:

- [Data mining conceptual] Jiawei Han, Jian Pei, Hanghang Tong. [Data Mining Concepts and Techniques](#). 4th edition. Morgan Kaufmann, 2023.
- [Python Data Analysis] Wes McKinney. [Python for Data Analysis](#), 3E. O'Reilly, 2023.
- [Prac Stats for DS] Peter Bruce, Andrew Bruce, Peter Gedeck. [Practical Statistics for Data Scientists](#). O'Reilly, 2016.
- [ISL] James Garth, Witten Daniela, Hastie Trevor, Tibshirani Robert. [An Introduction to Statistical Learning](#). Springer, 2021/2023.
- [Pract Time Series] Nielsen Aileen. [Practical Time Series Analysis](#). O'Reilly, 2020.

Course Schedule

An up-to-date schedule, assignments, and due dates can be found on the [course website](#). Dates and time is always in **Mountain Standard Time** (UTC-7).

Course Competencies

The course addresses the MS Competencies: C1 [A, B, C, D], C2, and C3

Course Community

UArizona Community Standard

All students must adhere to the [UArizona Student Rights & Responsibilities](#): The University of Arizona is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, and accountability. Citizens of this community commit to reflect upon these principles in all academic and non-academic endeavors, and to protect and promote a culture of integrity.

A Welcoming Community for Everyone

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are welcoming to everyone. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups.

Furthermore, I would like to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities. To help accomplish this:

- If you have a name that differs from those that appear in your official UArizona records, please let me know! You'll be able to note this in the Getting to know you survey.
- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. If you prefer to speak with someone outside of the course, your academic dean is an excellent resource.
- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please let me or a member of the teaching team know.

Communication

All lecture notes, assignment instructions, an up-to-date schedule, and other course materials may be found on the course website: <https://info523-fall25-101-201.github.io>.

I will regularly send course announcements via email and Slack, make sure to check one or the other of these regularly. If an announcement is sent Monday through Thursday, I will assume that you have read the announcement by the next day. If an announcement is sent on a Friday or over the weekend, I will assume that you have read it by Monday.

Where to Get Help

- If you have a question during lecture, feel free to ask it! There are likely other students with the same question, so by asking you will create a learning opportunity for everyone.
- The teaching team is here to help you be successful in the course. You are encouraged to attend office hours to ask questions about the course content and assignments. Many questions are most effectively answered as you discuss them with others, so office hours are a valuable resource. Please use them!
- Outside of class and office hours, any general questions about course content or assignments should be posted on the course Slack. There is a chance another student has already asked a similar question, so please check the other posts on Slack before adding a new question. If you know the answer to a question posted on Slack, I encourage you to respond!

Check out the [Support](#) page for more resources.

I want to make sure that you learn everything you were hoping to learn from this class. If this requires flexibility, please don't hesitate to ask.

- You *never* owe me personal information about your health (mental or physical) but you're always welcome to talk to me. If I can't help, I likely know someone who can.
- I want you to learn lots of things from this class, but I primarily want you to stay healthy, balanced, and grounded during this crisis.

Lectures

The goal of the lectures is for them to be as interactive as possible. My role as instructor is to introduce you new tools and techniques, but it is up to you to take them and make use of them. A lot of what you do in this course will involve writing code, and coding is a skill that is best learned by doing. Therefore, as much as possible, you will be working on a variety of tasks and activities throughout each lecture and lab. Attendance will not be taken during

class but you are expected to attend all lecture and lab sessions and meaningfully contribute to in-class exercises and discussion.

You are expected to bring a laptop to each class so that you can take part in the in-class exercises. Please make sure your laptop is fully charged before you come to class as the number of outlets in the classroom will not be sufficient to accommodate everyone. See the [UArizona Libraries loaner technology](#) if you need a loaner laptop.

Assessment

Assessment for the course is comprised of four components: participation, reading quizzes, homework assignments, and projects. All assignments are due by 11:59pm on the indicated day on the [course schedule](#).

- **Participation** is required throughout the semester. Students who participate regularly in Slack discussion will receive full credit for 10% of the grade.
- **Reading quizzes** (5), due every other week (roughly), completed individually. Each quiz is worth 2% of the grade.

Reading quizzes will be linked from the [course schedule](#). They always cover reading that is due since the previous quiz and up to and including the deadline for the given quiz.

- **Homework assignments** (5), due every other week (roughly), completed individually. Each homework assignment is worth 8% of the course grade. Lowest homework assignment score is dropped.
- **Final Project** (1), completed in teams, worth 40% of the course grade.

Teams will pick a dataset of interest to them and develop a data mining workflow in Python (problem → solution). The deliverables will include a data visualization and/or analysis, a write up of the process and findings, and a presentation. For the second project, you will be encouraged to think beyond traditional data mining techniques (i.e., explore and utilize modern best practices)

It will have a peer review component to provide at least one round of feedback during the process of development. Teams will provide periodic peer feedback to their teammates while working on the projects as well as upon completion. The scores from the peer evaluations, along with individual contributions tracked by commits on GitHub, will be used to ensure that each student has contributed to the teamwork.

All team members must take part in the presentation. Presentations must be given via Zoom, or in recording if the team requires. My preference is that the team stick to one method of delivery (all presenters on Zoom or in recording), but I realize a lot can change throughout this semester, and we'll adjust accordingly.

All work is expected to be submitted by the deadline and there are no make ups for any missed assessments. See [Late work policy](#) for policies on late work.

Grading:

The final letter grade will be determined based on the following thresholds:

| Letter Grade | Final Course Grade |
|--------------|--------------------|
| A | ≥ 90 |
| B | 80 - 89.99 |
| C | 70 - 79.99 |
| D | 60 - 69.99 |
| E | 50-59.99 |
| F | < 60 |

These are upper bounds for grade cutoffs. Depending on the class performance the cutoffs may be lowered, but not increased.

Teams

You will be assigned to a different team for each of your two projects. You are encouraged to work in a shared Slack channel with your team members. All team members are expected to contribute equally to the completion of each project and you will be asked to evaluate your team members after each assignment is due. Failure to adequately contribute to an assignment will result in a penalty to your mark relative to the team's overall mark.

You are expected to make use of the provided GitHub repository as their central collaborative platform. Commits to this repository will be used as a metric (one of several) of each team member's relative contribution for each project.

Course Policies

Academic Honesty

TL;DR: Don't cheat!

Students are expected to abide by The University of Arizona Code of Academic Integrity. 'The guiding principle of academic integrity is that a student's submitted work must be the student's own.' If you have any questions regarding what acceptable practice under this Code is, please ask an Instructor.

Please abide by the following as you work on assignments in this course:

- **Collaboration:** Only work that is clearly assigned as team work should be completed collaboratively.
- The reading quizzes must be completed individually with absolutely no communication with classmates.
- The homework assignments must also be completed individually and you are welcomed to discuss the assignment with classmates at a high level (e.g., discuss what's the best way for approaching a problem, what functions are useful for accomplishing a particular task, etc.). However you may not directly share answers to homework questions (including any code) with anyone other than myself and the teaching assistants.
- For the projects, collaboration within teams is not only allowed, but expected. Communication between teams at a high level is also allowed however you may not share code or components of the project across teams.
- **Sharing and reusing code:** I am well aware that a huge volume of code is available on the web to solve any number of problems. Unless I explicitly tell you not to use something, the course's policy is that you may make use of any online resources (e.g. RStudio Community, StackOverflow) but you must explicitly cite where you obtained any code you directly use (or use as inspiration). Any recycled code that is discovered and is not explicitly cited will be treated as plagiarism. On individual assignments you may not directly share code with another student in this class, and on team assignments you may not directly share code with another team in this class.

College of Information Science Academic Integrity Policy

This policy agreed upon by faculty in the UArizona College of Information Science applies in addition to the Dean of Students' [Code of Academic Integrity](#).

Students in courses at the UArizona College of Information Science are expected to maintain rigor in their academic performance with intent to learn, practice, and overcome challenges toward personal growth and enrichment. As future professionals in digital environments, College of Information Science students are also expected to exercise transparency and integrity in collaborations and in the use of tools and resources that may aid completion in assignments for our courses.

Consider the following PROHIBITED practices in this course, unless the instructor has specifically written instructions or permission to do otherwise:

- Posting a question on an online site such as Chegg.com, and copying and pasting some or all of the response into an assessment

- Posting an assessment from the course on online sharing sites such as Course Hero. Aiding other students in violation of academic integrity is also a violation, and is potential copyright infringement.
- Generating and submitting, in whole or in part, text or code through Artificial Intelligence such as ChatGPT, QuillBot, and text summarizers
- Using, in whole or in part, computer code not written by the student (for example, from another student, a book, or the internet) in an assignment or project. This includes using such code in modified or unmodified form.
- Searching for solutions to projects or assignments on the internet or through other tools, when your instructor intended for you to learn the solution through exercises (e.g. Googling for the solution to a question on an assignment).
- Simultaneously submitting the same assignment as another student enrolled into the course without prior permission from the instructor

Exceptions: Clear Instructions will be Provided

In any cases in which this course requires or permits students to use practices in the list above, clear written instructions will specify the tools allowed or required, so students can be certain they are working as instructed. See the [UArizona College of Information Science Academic Integrity Policy](#), the [UArizona Code of Academic Integrity](#) and [Syllabus policy](#) for more information.

Generative AI Policy

AI is Sometimes Permitted

As a researcher in human-AI interaction, I published highly impactful [research study](#) on how people use Generative AI for coding. I also personally use advanced AI coding tools (e.g. ClaudeCode, Cursor, etc.) as well as more straightforward tools (e.g. ChatGPT, GitHub Copilot, Gemini). Hence, I might have more to say about this topic.

Following the University’s [established AI policy](#), this class encourages you to use/experiment with Generative AI in all assignments and projects. - The only exception are **quizzes**. They serve as your own checkpoint and for your reflection purposes. Using AI there is a waste of time (and computing power), especially since we are not grading on whether you get to the correct answer. - Always keep control of your code and work by reviewing, criticizing, and steering AI responses While AI-generated code may appear legitimate, [my studies](#) show that tools like ChatGPT easily hallucinate or miss your intention. While latest tools such as Claude Code or Cursor may allow “autonomous” mode, it is still prone to overthinking or misunderstanding. - Whenever you use Generative AI tools, clearly state in your assignment or project write-up which Generative AI tool(s) you used, what you used it for, and how you incorporated its

output. In addition, **write reflections about your workflow and AI's responses, which will be graded.**

At the end of the day, Generative AI tools won't be responsible for your grades or your learning. Abusing of Generative AI tools be traced (e.g., failing to give credit or cite ChatGPT when it is used) which could result in your suspension or termination from the course and even your program of study.

See my policies on this subject above.

Late Work & Extensions

The due dates for assignments are there to help you keep up with the course material and to ensure the teaching team can provide feedback within a timely manner. We understand that things come up periodically that could make it difficult to submit an assignment by the deadline.

Policy on late work depends on the particular course component:

- Reading quizzes: Late quizzes are not accepted and there are no make ups for missed quizzes.
- Homework assignments: GitHub repositories will be closed to contributions at the deadline. If you need to submit your work late, send a DM on Slack to me to reopen your repository.
 - Late, within 24 hours of deadline: -10% of available points
 - Late, within 24-48 hours of deadline: -20% of available points
 - Two days late or later: No credit, and we will not provide written feedback
- Projects: The following three components contribute to your project score.
 - Presentation: Late presentations are not accepted and there are no make ups for missed presentations.
 - Write up: GitHub repositories will be closed to contributions at the deadline. If you need to submit your work late, Slack/email me to reopen your repository.
 - * Late, within 24 hours of deadline: -10% of available points
 - * Late, within 24-48 hours of deadline: -20% of available points
 - * Two days late or later: No credit, and we will not provide written feedback

- Peer evaluation: Late peer evaluations are not accepted and there are no make ups for missed presentations. If you do not turn in your peer evaluation, you get 0 points for your own peer score as well, regardless of how your teammates have evaluated you.

Free Passes

I allow three “free passes”, which extends your homework deadline by one full day. They can also be stacked, so two or three passes can apply to a single homework assignment. To utilize these passes, submit a GitHub issue with the number that you will be using. Use sparingly, I will not allow late un-penalized late work after they are gone.

Waiver for Extenuating Circumstances

If there are circumstances that prevent you from completing a reading quiz or homework assignment by the stated due date, you may email me (johnchen@arizona.edu) before the deadline to waive the late penalty. In your email, you only need to request the waiver; you do not need to provide explanation. This waiver may only be used for once in the semester, so only use it for a truly extenuating circumstance.

If there are circumstances that are having a longer-term impact on your academic performance, please let your academic dean know, as they can be a resource. Please let me know if you need help contacting your academic dean.

Regrade Requests

Before hw-02 (training wheels on)

I will regrade your homework assignments 1 once to encourage the correct format for future submissions. If you made any improvements, I will use the higher grade. Re-submissions must be received within 1-week of the original grade.

From hw-02 and on (training wheels come off)

Regrade requests must be made within one week of when the assignment is returned, and must be typed up and submitted via email to me. These will be considered if points were tallied incorrectly or if you feel your answer is correct but it was marked wrong. No regrade will be made to alter the number of points deducted for a mistake. There will be no grade changes after the second project presentations. Note that during the regrade process your score could go up or go down or not change.

No grades will be changed after the project presentations.

“Incomplete” Grade

The grade of “I” may be awarded only at the end of a term, when all but a minor portion of the course work has been satisfactorily completed. The grade of I is not to be awarded in place of a failing grade or when the student is expected to repeat the course; in such a case, a grade other than I must be assigned. Students should make arrangements with the instructor to receive an incomplete grade before the end of the term. If the incomplete is not removed by the instructor within one year the I grade will revert to a failing grade.

Tutoring

Tutoring can be found through the UArizona Think Tank.

Attendance Policy

While the online nature of the class adds to the flexibility, responsibility for class attendance rests with individual students. We cannot enforce when and how you watch the lecture videos. That said, students must accept the consequences of failure to attend or participate, including not being able to complete homework and turn in projects.

Note that participation is part of your grade as well.

Additional University Policies

Additional policies can be found at this link (please read through them): <https://catalog.arizona.edu/syllabus-policies>

Safety on Campus and in the Classroom

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): <https://cirt.arizona.edu/case-emergency/overview>

Also watch the video available at https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/common/learningeventdetail/crtfy000000000003560

Important Dates

See the full [UArizona Academic Calendar](#).

Graduate Student Resources

University of Arizona's Basic Needs Resources page for graduate students: <http://basicneeds.arizona.edu/index.html>