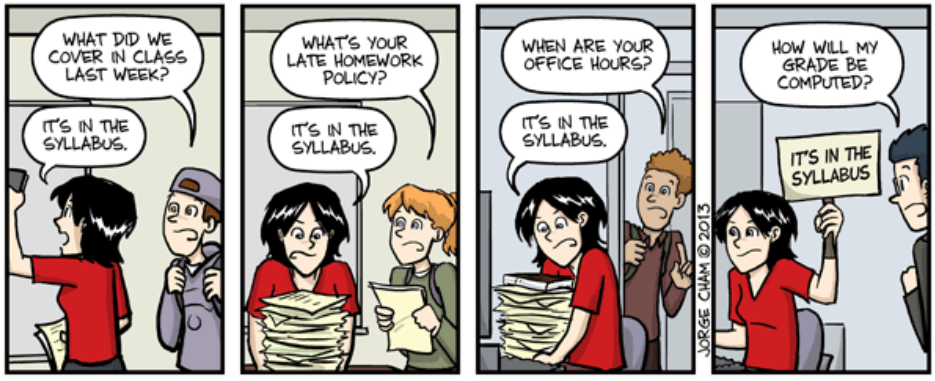
Intro to Artificial Intelligence
DATA 2810-01
Spring 2025: 1/13/2025 – 5/8/2025
Class Hours: Tues/Thurs, 12:30 – 1:45pm
Location: Gibson Hall room 126A

Instructor: John Levendis (he/him)
Office Location: Howard-Tilton Memorial Library B20
Email: jlevendis@tulane.edu
Office hours: Please see Module 0 in the course's Canvas page for the latest office hours.

Peer Mentor: Adel Rahman
As an additional educational resource for students, your peer mentor's responsibilities include answering easier questions about content or the course, taking attendance, helping during demo sessions, participating in discussion, facilitating review sessions outside of class, and meeting with students and groups during the semester. All general course concerns and grade questions should be directed to Dr. Levendis. In addition to Adel, Dr. Levendis is also available to you for questions and office hours.
Mentoring Hours: please see Module 0 in the course's Canvas page for the latest office hours.
Location: Academic Learning and Testing Center, basement of HTML
Email: arahman7@tulane.edu



Course Description

This course traces the evolution of AI from the perceptron to modern day large language models. Students will be exposed to the major branches of AI and the key concepts that allow computers to mimic (limited) human intelligence. Along the way, students will understand the strengths and weaknesses, and different capabilities of different AI architectures. Students will be able to speak intelligently about the current types of AI, and they will be able to identify constructive use cases, as well as potential risks and dangers of AI.

Prerequisites: None

Required textbooks:

- Mitchell, Melanie (2019). *Artificial Intelligence: A Guide for Thinking Humans*. Pelican Press: New York. ISBN-10: 0241404835

Course Objectives

At the successful completion of the course, students should be able to:

1. Describe generally the operations and structure of different types of neural networks and how that structure helps them perform specific tasks involving images or language.
2. Describe the history of AI to the present day.
3. Explain how AI systems can become biased, the consequences of this bias, and how these can be reduced.
4. Define and describe common concepts related to AI, supervised and unsupervised learning, classification and regression, and discriminative and generative AI.
5. Define and describe fundamental structures related to AI, such as neurons, activations, neural Networks, loss functions, weights and biases, and gradient descent.

Dr. Levendis. Will any of this be relevant once AI takes over?

Criteria for Assigning Course Grades:

There are four equally-weighted components to the class:

1. Weekly reading quizzes/HWs (dropping lowest two)
2. Problem Sets (dropping lowest)
3. Midterm exam
4. Final exam

Your average as reported in Canvas excludes the attendance modification. You can calculate it in Excel:

	A	B	C	D
1	**Item**	**Weight**	**Your Score**	**Weight x Your Score**
2	Reading HWs	0.25	_____	=B2*C2
3	Problem Sets	0.25	_____	=B3*C3
4	Midterm Exam	0.25	_____	=B4*C4
5	Final Exam	0.25	_____	=B5*C5
6				=SUM(D2:D5)
7	# of unescused absences =		_____	
8	Your final grade in the class =			=D6 - 5*C7

Grade	Percent
A	100% to 93%
A-	< 93% to 90%
B+	< 90% to 87%
B	< 87% to 83%
B-	< 83% to 80%
C+	< 80% to 77%
C	< 77% to 73%
C-	< 73% to 70%
D+	< 70% to 67%
D	< 67% to 63%
D-	< 63% to 60%
F	< 60% to 0%

Canvas grades vs official Gibson grades

Canvas helps you keep track of your grades on individual assignments. You may find Canvas' total column does not match your final grade on Gibson. Gibson is always the official register of grades. In short, you should calculate your own class average, rather than rely on Canvas' flawed calculations. (According to Canvas, 1/3 + 1/4 = 2/7.)

Reading Quizzes (aka "HWs"):

Each week you will have an assigned reading, and some HW questions on the reading. Graded HW will be submitted via Canvas. **There are no extensions, and late assignments are not accepted. I will drop your lowest two Reading Quizzes.**

You have until midnight (actually, 11:59pm central time) on Sunday to complete the week's HWs. You can retake them as many times as you wish, and I'll keep your highest score. Please don't put off your HW to the last minute; Murphy's Law always seems to find a way to mess with the best laid plans, and there are **no extensions on late HWs/Quizzes.**

Problem Sets:

Problem Sets will require you to apply some of the concepts from classroom using either math, Excel, or Python. These are much more involved. You should begin working on these as early as possible. **I will drop your lowest Problem Set grade.** Students should expect to complete problem sets in the following areas:

1. Feed Forward Neural Networks
2. The Perceptron update rule (Excel)
3. Counting parameters in multilayer perceptrons
4. Function Approximation (Python)
5. Activation functions
6. CNNs and Image Classification (Python)
7. Word Embeddings and Word2Vec (Python)

Attendance:

Attendance is **required and graded. You are allowed four excused absences** (think of these as personal days or sick days not requiring a doctor's note); these absences won't affect your grade. You also have an unlimited number of excused absences provided these originate with Student Affairs, the Athletics Department, or the Goldman Center for Student Accessibility. Beyond these four, **each unexcused absence results in a deduction of 5 points off your final class average**. (Canvas can't calculate this deduction, so it won't show up in your gradebook. I'll assess it at the end of the course.) To be marked as "attending" you must be on time for class.

With the approval of the Newcomb – Tulane College dean, I may have a student who has excessive absences involuntarily withdrawn from a course with a WF grade after written warning at any time during the semester. Students do not need to notify me to justify why they missed class, but students should check in with me if their absences affect a major grading event.

Extensions and Accommodations:

I regularly get emails from students asking for extensions on HWs or Problem Sets. I am legally and ethically obligated to treat each student equally, so I cannot make special exceptions.

I do, however, give all of my students' ample time to complete their assignments. This extended time table is in place so that you can plan around family obligations, scheduled meetings, sporting events, and (more importantly) unscheduled emergencies (computers crashing, roommate emergencies, etc.).

Inevitably, "life happens" and an emergency occurs. Knowing that these things may happen, it is up to you to take advantage of the extended time table and complete your work as early as possible.

There are a couple of exceptions to this rule; but requests for accommodation, flexibility, or excusal must follow the proper procedures:

> Tulane University is committed to offering classes that are accessible. If you anticipate or encounter **disability-related barriers** in a course, please contact the **Goldman Center for Student Accessibility** to establish reasonable accommodations. If approved by Goldman, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. I will never ask for medical documentation from you to support potential accommodation needs. Goldman Center contact information: Email: goldman@tulane.edu; Phone (504) 862-8433; Website: accessibility.tulane.edu

Unless I am specifically instructed by the Goldman Center for Student Accessibility, Student Affairs, or the Department of Athletics, I do not grant extensions or make-ups. A missed assignment or exam without an excused absence earns a grade of zero.

Tentative Schedule: This calendar is likely to change.

Week of	**Topic**
Jan 13 – Jan 19	Intro to class, Prologue of textbook
Jan 20 – Jan 26	Ch 1 on the roots of AI
Jan 27 – Feb 2	Ch 2 on Neural Networks and Machine Learning
Feb 3 – Feb 9	Ch 2 continued (logic gates)
Feb 10 – Feb 16	Ch 2 continued (perceptron update rule)
Feb 17 – Feb 23	Ch 3 on AI Spring (multilayer perceptrons and gradient descent)
	Midterm
Feb 24 – Mar 2	Ch 4 on Convolutional Neural Networks
Mar 3 – Mar 9	No class. Mardi Gras Holidays
Mar 10 – Mar 16	Ch 4 continued

Mar 17– Mar 23	Ch 5 on ImageNet and image classification
Mar 24 – Mar 30	Ch 6 on "A closer look at Machines that Learn"
Mar 31 – Apr 6	Ch 7 on "Trustworthy and Ethical AI"
Apr 7 – Apr 13	Ch 11 on NLP, Markovian text generation
Apr 14 – Apr 20	No class on the 15th.
	Ch 11 continued (word2vec)
Apr 21 – Apr 27	Ch 12 on encoder/decoder networks (with discussion of LLMs)
Apr 28 – May 4	Chs 14-15 on analogy, abstraction and reasoning (ARC)
	No class on Thursday, May 1st.
May 5 – Dec 13	Final exam week

Additional Expectations:

Civility: Please be civil in all interactions with your classmates and instructors. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of students to benefit from the instruction is not acceptable. Examples include routinely entering class late or departing early; talking while others are speaking; or arguing in a way that is perceived as "crossing the line of civility."

Lateness: If you are habitually late to class, you will be asked to leave and you will be marked as absent.

Email: I communicate with the class via **Canvas email**. Please make sure that your email address as listed in Canvas is correct, and that you **monitor your emails regularly**.

Code of Academic Conduct

The Code of Academic Conduct applies to all undergraduate students, full-time and part-time, in Tulane University. Tulane University expects and requires behavior compatible with its high standards of scholarship. By accepting admission to the university, a student accepts its regulations (i.e., Code of Academic Conduct and Code of Student Conduct) and acknowledges the right of the university to take disciplinary action, including suspension or expulsion, for conduct judged unsatisfactory or disruptive.

Unless I indicate differently on instructions, all assignments and exams are to be completed individually and without any study aid, including textbooks, class notes, AI, or online sites. To reiterate, in the absence of explicit permission from your instructor, **the use of generative AI is**

prohibited by Tulane's academic integrity policies. If you have any question about whether a resource is acceptable, you must ask the instructor rather than assume.

Religious Accommodation Policy

Per Tulane's religious accommodation policy as stated at the bottom Tulane's academic calendar, I will make every reasonable effort to ensure that students are able to observe religious holidays without jeopardizing their ability to fulfill their academic obligations. Excused absences do not relieve the student from the responsibility for any course work required during the period of absence. Students should notify me within the first two weeks of the semester about their intent to observe any holidays that fall on a class day or on the day of the final exam.

Equity, Diversity, and Inclusion Statement (EDI)

"Equity, diversity, and inclusion (EDI) are important Tulane values that are key drivers of academic excellence in our learning environments. In our drive for academic excellence, we seek to ensure that students, faculty, and staff across diverse social identities, cultural backgrounds, and lived experiences can thrive - especially those from underrepresented and underserved communities (e.g., race/ethnicity, gender identity and expression, sexual orientation, disability, social class, international, veterans, religious minorities, age, and any other classification protected by applicable law - see Tulane's Nondiscrimination Policy). In order to build a supportive culture and climate for every member of our community, we recognize that we each of have unique EDI strengths to share with others and that we also have areas for EDI growth, learning, and change. This EDI commitment and cultural humility helps us collectively build a university community and culture where everyone experiences belonging."

Emergency Preparedness & Response

EMERGENCY NOTIFICATIONS: TU ALERT	**SEVERE WEATHER**
In the event of a campus emergency, Tulane University will notify students, faculty, and staff by email, text, and/or phone call. You were automatically enrolled in this system when you enrolled at the university. Check your contact information annually in Gibson Online to confirm its accuracy.	▪ Follow all TU Alerts and outdoor warning sirens ▪ Seek shelter indoors until the severe weather threat has passed and an all-clear message is given ▪ Do not use elevators ▪ Do not attempt to travel outside if weather is severe Monitor the Tulane Emergency website (tulane.edu/emergency/) for university-wide closures during a severe weather event
ACTIVE SHOOTER / VIOLENT ATTACKER	**EVERBRIDGE APP**

▪ **RUN** – run away from or avoid the affected area, if possible ▪ **HIDE** – go into the nearest room that can be locked, turn out the lights, and remain hidden until all-clear message is given through TU ALERT ▪ **FIGHT** – do not attempt this option, except as a last resort ▪ For more information or to schedule a training, visit emergencyprep.tulane.edu	▪ Download the Everbridge app from the App Store or Google Play store ▪ The Report feature allows you to silently and discreetly communicate with TUPD dispatchers ▪ The SOS button allows you to notify TUPD if you need help ▪ The Safe Corridor button serves as a virtual escort and allows you to send check-in notifications to TUPD

From: Tulane Office of Emergency Preparedness and Response

Title IX

Tulane University recognizes the inherent dignity of all individuals and promotes respect for all people. As such, Tulane is committed to providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, intimate partner violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available: you can learn more at allin.tulane.edu. Any and all of your communications on these matters will be treated as either "Confidential" or "Private" as explained in the chart below. Please know that if you choose to confide in me I am required by the university to share your disclosure in a Care Connection to the Office of Case Management and Victim Support Services to be sure you are connected with all the support the university can offer. The Office of University Sexual Misconduct Response and Title IX Administration is also notified of these disclosures. You choose whether or not you want to meet with these offices. You can also make a disclosure yourself, including an anonymous report, through the form at tulane.edu/concerns.

Confidential	**Private**
Except in extreme circumstances, involving imminent danger to one's self or others, nothing will be shared without your explicit permission. ▪ Counseling & Psychological Services (CAPS) | (504) 314-2277 ▪ The Line (24/7) | (504) 264-6074	*Conversations are kept as confidential as possible, but information is shared with key staff members so the University can offer resources and accommodations and take action if necessary for safety reasons.* ▪ Case Management & Victim Support Services | (504) 314-2160 or srss@tulane.edu ▪ Tulane University Police (TUPD) | Uptown - (504) 865-5911 | Downtown – (504) 988-5531

▪ Student Health Center | (504) 865-5255 ▪ Sexual Aggression Peer Hotline and Education (SAPHE) | (504) 654-9543	▪ Office of University Sexual Misconduct Response and Title IX Administration | (504) 865-5611 or titleix@tulane.edu ▪ Student Affairs Professional On-Call (24/7) | (504) 920-9900

Terms of Use:

A student's continued enrollment in this course signifies acknowledgment of, and agreement with, the statements, disclaimers, policies, and procedures outlined within this syllabus and elsewhere in the Canvas environment. This Syllabus is a dynamic document. Elements of the course structure (e.g., dates and topics covered, but not policies) may be changed at the discretion of the professor.