

- . Github account (Free)
- . Github classroom (Free)
- . JupyterLab with Jupyter note books. (Free)
- . Various tools and libraries as directed by the instructors.

Course description: This course provides an introduction to machine learning.

Student learning outcomes:

Upon completion of this course, each student should be able to:

1. Work with data to determine needed transformations and create training and test sets.
2. Do basic explorations of the data to guide machine learning
3. Identify the Bias vs Variance tradeoff.
4. Pick an appropriate model and train it.
5. Validate their model.
6. Present/Use their model in an interesting way.
7. Understand the difference between classifiers and predictors.
8. Can use and describe the following kinds of models
 - a. Linear and Polynomial Regression
 - b. Binary classifiers
 - c. Decision Trees
 - d. Support Vector Machines
 - e. Neural Nets
9. Create an ensemble model.
10. Use and describe the advantages of the Tensor Flow package.
11. Use notebooks and markdown to organize and their work on a project.

Assessment methods: Desired Student outcomes will be assessed via programming and homework assignments, quizzes, midterms, and a final exam.

Instructional methods: Instructional methods include lectures, individual work, and quizzes.

Graded course requirements:

Category	Weight
Attendance	5%
Quizzes	5%
Assignments	20%
Midterm Exams (2)	35%
Final Project	15%
Final Exam	20%
Total	100%

Grading scale:

Undergraduate Credit		Graduate Credit	
Percent Range	Grade	Percent Range	Grade
88-100%	A	90-100%	A

>= 78% and < 88%	B	>= 80% and < 90%	B
>= 68% and < 78%	C	>= 70% and < 80%	C
>= 58% and < 68%	D	>= 60% and < 70%	D
below 58%	F	below 60%	F

Course outline/major topics studied:

This is a tentative schedule and is subject to change. For exact information, including important dates, check the course website.

Tentative Spring 2026 Schedule

Date	Content
Week 1	Introduction to the course. Jupyter, Python and Notebooks.
Week 2	Introduction to Python
Week 3	Getting data, Pandas, Data Frames Splitting
Week 4	Project Proposal, Friday Exploring the space Binary Classification, Model Evaluation
Week 5	Model Parameters, Hyper-parameters, Regression, Minimization
Week 6	Bias vs. Variance Polynomial Regression, Cross validation Midterm 1, Thursday, in class
Week 7	General regularization, Pipe Lines. Project Milestone 1, Friday
Week 8	Spring Break – No class
Week 9	Decision Trees SVM and Kernals
Week 10	K-means clustering
Week 11	Data selection, PCA, MNIST Project Milestone 2, Friday
Week 12	Ensemble Learning Neural Nets, Perceptrons
Week 13	Neural Nets, back propagation, deep learning, activation functions Midterm 2, Thursday, in class
Week 14	Convolutional Neural Nets, Tensor Flow Project Milestone 3, Friday
Week 15	Final Exam Thursday, in Class Final Project Submission (Poster/Repo) Friday
Finals Week (Week 16)	Project Presentations Tuesday, April 28 12:20 pm - 2:20 pm CH1400

Note: Course schedule is subject to change with instructor notification and students will be responsible for

abiding by these changes.

Academic Calendar: <http://www.nwmissouri.edu/academics/calendar.htm>

Final Exam Schedule: <http://www.nwmissouri.edu/registrar/finals.htm>

Programming Assignments

All programming assignment are to be submitted electronically by the due date. Work can be submitted late up to 24 hours, but will be assessed a penalty of 10% of the maximum possible score on the assignment. Any work submitted after the late period will receive **NO** credit. The number of points for an assignment may vary depending on the difficulty of the assignment.

Homework Assignments

There will be some written homework assignments that will be assigned as needed. Those assignments will be due at the beginning of the class period and will be scanned electronically and then returned immediately. A solution will be posted and students are expected to review them and be ready for a quiz over that material in the next class period. Late submissions will not be accepted and will receive **NO** credit.

Paper Quizzes

Once a written assignment has been submitted, there will be a 10 minute written quiz during the next class period. After a set of material has been covered, there may be an unannounced quiz over that material.

Exams

The midterms and final will be held on the dates specified. If you must miss an exam, it is your responsibility to notify the instructor in person prior to the exam and to provide the instructor with written verification of the reason for your absence. Failure to follow these instructions may result in a grade of zero on the exam.

All quizzes/exams are closed book and no resources are allowed.

No calculators, cell phones, or other electronic devices can be used during exams or quizzes unless explicitly allowed by the instructor.

Make-ups for written quizzes, in class activities, and exams will be given only for valid and verifiable reasons. Valid reasons include emergency health reason, immediate family emergencies, and university-sponsored trips (same as Attendance policy). Written documentation with suitable verification must be supplied before a make-up will be allowed.

Final Project

- All students must complete a final project
- The final project will be individual.
- Students will be required to provide a **final project proposal, three milestones, and present a poster for their final project.** (See schedule for dates.)

Grade verification:

Your score on each component will be posted on Canvas as soon as that component has been graded. You are

responsible for checking Canvas at least once a week to ensure that your grades are properly posted. ***If there is an error in grading, you must bring that to the attention of the class assistant or instructor within one week of the time the grade is posted. Grades cannot be changed after the one-week period.***

Attendance

You are expected to attend class each day AND BE ON TIME. Attendance will be a factor in your grade. If you are late to class, you will receive 50%. If you miss a quiz, you will get a zero for it. If you must miss class due to valid reason or by circumstances considered extenuating by the course instructor, it is your responsibility to inform the instructor/TA BEFORE class time via email. If the instructor/TA was not notified before class time, the absence will be unexcused and you will get a zero for that day. Please refer to the general university policy on attendance at <https://www.nwmissouri.edu/policies/academics/Attendance.pdf>

The following excused absences are acceptable only:

1. Attendance at a university-sponsored event (Official documentation with an excuse signed by the university sponsor prior to the event).
2. Emergency health reason (illness and injury; Official local medical documentation with a valid reason statement and Official local doctor's notes).
3. Immediate family emergency case by circumstances considered adequately extenuating by the course instructor (serious illness, injury, or death; Official documentation with a valid reason statement and proof).

Personal Equipment and Software: You will be required to use a computer to complete the assignments or exams for this course. Essential requirements are a modern operating system (Windows, Mac, or Linux) that meets the assignments and exam requirements. It is the student's responsibility to make his/her computer system meet the requirements of the assignments or exam. Each student has one chance per semester to request an extension due to these technical issues, requiring a written explanation along with screenshot, error logs, or other evidence that clearly shows the issue along with the specific date and time. As a computer science graduate student, you must develop the ability to troubleshoot common software configuration issues using a search engine, online tutorials, web forums, and other common tools.

Class Participation

As well as attending all classes, you are expected to be an active participant in classroom activities and discussions.

Classroom Decorum

Students are required to come to class prepared for the day's activities. That means be in your seat before the class starts, with the textbook, notepaper or notebook and writing instrument. We will start class promptly at the designated time.

Cell phones and pagers must be turned off during class time and are not allowed during exams. Laptop computers and handhelds may be used during class time if they are being used for a class activity, such as taking notes. Students are not to read or send e-mails, text messages, or surf the web during class time. Anyone using an electronic device to give or receive assistance during exams will be in violation of the "Academic Integrity" section of the catalog.

Professionalism and email: Students are expected to behave in a professional manner in their dealings with each other, the class assistant, and the instructor. Emails should be politely written, use proper grammar, and follow the rules of capitalization.

Emails **must** include the course number (44-566) and section number (01) in the subject line. For example: '[44566-01] Query about Assignment 2'. For security reasons, emails that do not include an appropriate entry

for the subject will be ignored. Emailed queries on material found in the Canvas course areas will NOT be answered.

Artificial Intelligence Engines: Generative AI engines, such as ChatGPT, are fast becoming important tools to help improve various personal, professional, and educational tasks. Specifically for this course, the submission of academic work created by a generative AI engine is not allowed. All submitted course work must be your own work. The goal is for you to learn and understand the course content. AI engines are a tool which can help facilitate the learning process. The understanding of course content is assessed by completing the required course work. Your understanding cannot be gauged if AI generated material is used.

Refer to Syllabus Addendum for additional information.