



44-670

Applied Machine Learning

Spring 2023

COURSE SYLLABUS



I. Course Title

44-670 Applied Machine Learning

II. Course Credit

3 hours.

III. Placement in Curriculum

Students can take this course any time after completing Data Analytics Fundamentals.

IV. Prerequisites

CSIS 44-608 Data Analytics Fundamentals

V. Course Professors

Lead Professor

Name: Dr Charles Hoot

Title: Assistant Professor

Phone: 660-562-1801

Email: hoot@nwmissouri.edu

Office Hours: MWF 5-7

Office Location: Colden Hall 2163

VI. Course Description

Students will use machine learning models to build tools to perform novel analyses of data sets. Topics will include data acquisition and cleaning, selecting and evaluating predictive models, regression models, classification models, and deep learning with neural nets.

VII. Course Rationale

In today's automated society, massive amounts of data are collected. Data, however is not information. Machine learning provides tools that can analyze data to allow decisions to be made via software tools. We will look at the application of those tools in this course to produce high quality models.

VIII. Course Outcomes

Student Learning Outcomes:

1. Describe the use of ML
2. Work with data
3. Use data to create a model
4. Publish a model

Assessment methods:

Quiz, Discussion
Discussion, Lab
Discussion, Lab
Lab

IX. Materials

Textbook or supplementary materials

Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow 3rd Ed. – Geron

Other Resources

Video/Slide sets.

X. Course Outline and Expectations

This course has seven modules each of which is expected to be done over a week. The week will start with a set of video lectures and reading from the book. A quiz over that material will be available through midweek. From there, you will have two assignments to complete. The lab assignment will be a hands on guided exploration of SciKit Learn on JupyterLab using python, while the discussion assignment will look at an area of interest for the week in more depth.

Each assignment within a category will be for roughly the same amount of points. Your score for a category will be the fraction of the points achieved over the assignment. That score will be multiplied by the category weight.

Instructional Methods and Techniques

We will have weekly video lectures with slides, graded online discussions in small groups, graded lab assignments, and quizzes.

There will be a midterm and a final.

Participation/Attendance

“Students are expected to attend all classes as specified in the course syllabi for each course. However, specific attendance policies may vary from instructor to instructor. Each instructor will clarify the attendance policy at the beginning of each course. It is the responsibility of the student to promptly notify his or her instructor when unable to attend class. Students receiving veterans’ benefits should consult with the coordinator of Veterans’ Affairs for the additional attendance requirements.

A student may make up class work without penalty if engaged in University activities endorsed by the Provost or prevented from attending by circumstances considered adequately extenuating by the course instructor.

After the add period until the end of the drop period, an instructor may request the Office of the Registrar to delete a student from the class roster due to non-attendance.”

<http://nwmissouri.smartcatalogiq.com/en/2016-2017/Undergraduate-Catalog/Policies-and-Regulations/Academic-Policies/Attendance>

Code of Academic Integrity

Please refer to the following link to view Northwest Missouri State University’s Code of Academic Integrity Policy

<http://www.nwmissouri.edu/policies/academics/Academic-Integrity.pdf>

Family Educational Rights and Privacy Act (FERPA)

Please refer to the following link to view Northwest Missouri State University’s policy for Family Educational Rights and Privacy Act (FERPA):

<http://www.nwmissouri.edu/policies/academics/Family-Educational-Rights-and-Privacy-Act.pdf>

Accessibility and Accommodations

Northwest Missouri State University complies with Section 504 of the Rehabilitation Act of 1973 and the American with Disabilities Act of 1990.

If a student has a documented disability that qualifies under ADA and requires accommodations, he/she/they should contact the Accessibility and Accommodations Office for information and assistance. Disabilities accommodated under ADA may include living, learning, psychological, physical disabilities, or chronic health disorders.

Information about supporting documentation requirements and the accommodations application can be found at the University Title IX and Equity, Accessibility & Accommodations website <https://www.nwmissouri.edu/titleixequity/accessibility/index.htm>

Students with questions about learning accommodations should contact the Accessibility Coordinator in the Title IX and Equity, Accessibility and Accommodations Office at ADA@nwmissouri.edu.

If you have been approved for a learning accommodation and received an accommodations approval letter, or if you have emergency medical information you choose to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately.

Non-Discrimination Statement

Northwest Missouri State University (the “University”) is committed to maintaining an environment for all faculty, staff, students, and third parties that is free of illegal discrimination and harassment. In keeping with that policy, the University prohibits discrimination and harassment by or against any faculty, staff member, student, applicant for admissions or employment, customer, third-party supplier or any other person (collectively the “University Community”) because of their race, color, religion, national origin, sex, sexual orientation, gender identity, pregnancy, ancestry, age, disability, genetic information, veteran status, or any other legally-protected class (collectively “protected statuses”). <http://www.nwmissouri.edu/diversity/titlevi.htm>

Course Communication Policy

There are two primary means of getting in touch with your instructor.

- 1) Use the pinned discussion “Ask your Instructor.”
- 2) Send an email. Please include 44-670 ML in the title so that it gets sorted into the right folder.

If needed, we can arrange a zoom or discord session.

Course Communication Guidelines (Netiquette)

Be patient and respectful of others.

XI. Technology Requirements

Computer/Technology Requirements

You will need to have a computer with a browser and a functioning internet connection. This will need to be fast enough to view video. There will be some assignments that will require a calculator. I expect that you have Microsoft Word, but it is not critical. I expect that you have some means of displaying PDF files like Adobe Acrobat Reader.

Most of computing we will do will be hosted on your personal computer using Python and JupyterLab. Your computer doesn't have to be the fastest machine around, since we will primarily be working with small data sets. Either a Mac or a PC running windows of recent vintage should be fine. Once Python and Jupyter Lab are installed in a container, the differences between operation on a PC and Mac should be minimal and mostly require the ability to copy/move files and open a command line interface. It should also be possible to run Linux, but you are on your own.

Northwest Online (Canvas)

Access to Northwest Online is at: <https://www.nwmissouri.edu/online>

Web Conferences/Synchronous sessions

Zoom and Discord are available

XII. Grading and Evaluation

Final Grade Calculation

| Assessments | Percentages |
|-------------|-------------|
| Quizzes | 15 |

| | |
|------------------------------------|-----|
| Discussions | 30 |
| Lab Assignments | 30 |
| Midterm | 15 |
| Final Exam | 10 |
| | |
| Total Percentage For Course | 100 |

In general, the recurring module assignments will be due on the following days.

Wednesday: Initial individual discussion posts

Thursday: Quiz

Sunday: Group response discussion posts

Sunday: Lab assignment

The midterm and final will be due Sunday of weeks 4 and 7.

Grading

In determining the final course grade, the following scale is used:

90 = A

80 = B

70 = C

60 = D

The weighted score will be rounded to the nearest integer value.

Rubrics

Rubrics will be provided online for the lab and discussion assignments.

Late Work Policy

Lab assignments will be accepted up to one day late with a 10% deduction.

No other assignments or work will be accepted after the deadline.

XIII. Course Evaluation

At the end of this course, students are encouraged to complete a course evaluation that

will be distributed to them via email and through a course link.

XIV. Course Topics

| | |
|-----------------|-----------------------------|
| Module 0 | Introduction. |
| Module 1 | Machine Learning Overview |
| Module 2 | Data and Features |
| Module 3 | Classifier Models |
| Module 4 | Regression Models |
| Module 5 | Ensembles |
| Module 6 | Deploying a Model |
| Module 7 | Advanced Model Applications |

XV. Additional Course Information

Syllabus Subject to Change

While information and assurances are provided in this course syllabus, it should be understood that content may change in keeping with new research and literature and that events beyond the control of the instructor could occur. Students will be informed of any substantive occurrences that will produce syllabus changes.