

Course Syllabus for SIADS 655: Applied Natural Language Processing

Course Overview and Prerequisites

This course introduces students to working with language data and how to turn unstructured text into structured information for use with other data science areas. Students will learn how to use common techniques and software libraries for analyzing the semantics and syntax of language.

The prerequisites for SIADS 655 include:

- SIADS 542: Supervised Learning (C- or better)
- SIADS 643: Machine Learning Pipelines (C- or better)

Instructor and Course Assistants

Instructor: David Jurgens, Ph.D. Assistant Professor, School of Information and Electrical Engineering & Computer Science

Course Assistant: Minje Choi (GSI)

How to Get Help

If you have questions concerning the degree program, encounter a technical issue with Coursera, or issues using Slack, please submit a report to the ticketing system at umsimadshelp@umich.edu.

If you have an issue specific to the Coursera environment, you can also begin a [live chat session](#) with Coursera Technical Support (24/7) or view [Coursera troubleshooting guides](#). (you may be asked to log in to your Coursera account).

For questions regarding course content, refer to the **Communications Expectations** section below.

Course Communication Expectations

Slack is the preferred communication tool for this course. If you have questions about course content (e.g. lecture videos or assignments), please make sure to use Slack. Instructor and course assistant response time to **Slack** messages will aim to be within 24 hours, Monday-Friday and 48 hours on weekends. **Please try to monitor the Slack channels for the course regularly.**

Personal communication that may involve sensitive information may be emailed directly to the instructor or course assistant. If you email the instructor or course assistant, please include SIADS 655 in the email subject. Instructor and course assistant response time to **email** messages will be within 24 hours.

Textbook Information

This course will use the following textbook, and can be accessed through links found within the course:

Jurafsky, Dan, and Martin, James H. Speech and Language Processing : An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition. Third Edition draft.

Learning Outcomes

- Train a text classifier using simple text features for any task
- Use the basic forms of text data and how to work with each in a machine learning setting

- Evaluate text-based models
- Work with word vectors in classification settings
- Describe and use the structure of language (syntax) and how to make use of it in applications
- Train word vector models
- Recognize that words have different meanings that can be distinguished
- Use basic operations in NLP software libraries like Gensim and NLTK
- Be aware of many NLP applications and how they relate to the content covered in this course
- Be aware of parsing algorithms
- Be aware of graphical models like HMMs and CRFs
- Be aware of social, pragmatic, and common-sense knowledge in text

Course Schedule

- This course begins on **Wednesday, March 31, 2021 at 3:00 a.m. EDT** and ends on **Tuesday, April 27, 2021 at 11:59 p.m. EDT**.
- All assignments are due at the end of the course.

Week 1: Build and train multiple standard text classifiers, learn how to turn text into meaningful features, understand how hyper-parameters affect performance, and plot results for different amounts of training data to see how textual variability affects performance.

Week 2: Train a word2vec model on data, compare off-the-shelf vectors with the trained vectors in a classification task, use those vectors to measure word similarity in an evaluation.

Week 3: Write programs that use part of speech tagging, dependency parsing, and coreference models to extract simple information from a text corpus and analyze that information.

Week 4: Train a word sense disambiguation (WSD) system using classifiers, compare performances for unsupervised and supervised WSD systems, and, train a classifier to predict social/pragmatic information from text (e.g., sarcasm)

Weekly Office Hours via Zoom (Ann Arbor, Michigan time):

Your instructor will hold weekly, synchronous office hours using the video-conferencing tool, Zoom. The schedule of office hours can be found by clicking on the **Live Events** link in the left-hand navigation menu. Additionally, all office hours will be recorded and archived so that you can retrieve them at a later date.

Grading

Course Item	Percentage of Final Grade	Due Date
Week 1 Notebook Assignment	25%	Tuesday, April 27, 2021 at 11:59 pm EDT
Week 2 Notebook Assignment	25%	Tuesday, April 27, 2021 at 11:59 pm EDT
Week 3 Notebook Assignment	25%	Tuesday, April 27, 2021 at 11:59 pm EDT

Week 4 Notebook Assignment	25%	Tuesday, April 27, 2021 at 11:59 pm EDT
----------------------------	-----	---

Note: All assignments are required to earn credit for this course.

Letter Grades, Course Grades, and Late Submission Policy

This course requires you to complete all four assignments for full credit. You'll see from the above grading schema that all four sections' assignments are due at the end of the course. **Do not procrastinate - it is your responsibility to manage your time and submit assignments in a timely manner.** You may want to consider submitting assignments as you complete them this week.

Any assignments submitted after Tuesday, April 27 will be awarded zero points.

The grading scale for this course is as follows:

A+	97%
A	93%
A-	90%
B+	87%
B	83%
B-	80%
C+	77%
C	73%
C-	70%
D+	67%
D	63%
D-	60%
F	0%

Academic Integrity/Code of Conduct

Refer to the [Academic and Professional Integrity](#) section of the UMSI Student Handbook. (access to Student Orientation course required).

Accommodations

Refer to the [Accommodations for Students with Disabilities](#) section of the UMSI Student Handbook (access to the Student Orientation course required). Use the [Student Intake Form](#) to begin the process of working with the University's Office of Services for Students with Disabilities.

Accessibility

Refer to the [Screen reader configuration for Jupyter Notebook Content](#) document to learn accessibility tips for Jupyter Notebooks.

Library Access

Refer to the [U-M Library's information sheet](#) on accessing library resources from off-campus. For more information regarding library support services, please refer to the [U-M Library Resources](#) section of the UMSI Student Handbook (access to the Student Orientation course required).

Student Mental Health

Refer to the University's [Resources for Stress and Mental Health website](#) for a listing of resources for students.

Student Services

Refer to the [Introduction to UMSI Student Life](#) section of the UMSI Student Handbook (access to the Student Orientation course required).

Technology Tips

- Recommended Technology
 - This program requires Jupyter Notebook for completion of problem sets and Adobe or other PDF viewer for reading articles.
- Working Offline
 - While the Coursera platform has an integrated Jupyter Notebook system, you can work offline on your own computer by installing Python 3.5+ and the Jupyter software packages. For more details, consult the Jupyter Notebook FAQ.