COMP SCI 540 section 001 Syllab

Introduction to Artificial Intelligence

COURSE INFORMATION

Introduction to Artificial Intelligence

COMP SCI 540 001 (3 Credits)
2021 Spring [1214]

Description

Principles of knowledge-based search techniques, automatic deduction, knowledge representation using predicate logic, machine learning, probabilistic reasoning. Applications in tasks such as problem solving, data mining, game playing, natural language understanding, computer vision, speech recognition, and robotics. Enroll Info: None

Prerequisite(s)

(COMP SCI 300 or 367) and (MATH 211, 217, 221, or 275) or graduate/professional standing or declared in the Capstone Certificate in Computer Sciences for Professionals

Breadths

N - Natural Science

Instruction Mode

Online Only

Section Level Com B

False

Department: Computer Sciences
College: Letters and Science

2021 Spring [1214]

Term Start Date: Monday, 25-Jan-2021 **Term End Date:** Tuesday, 1-Jun-2021

Location and Schedule: ONLINE TR 2:30 PM-3:45 PM
CRN: 266004280

How Credit Hours are Met

This class meets for two 75-minute class periods each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

Regular and Substantive Student-Instructor Interaction

In the regular lecture time (Tuesday and Thursday 2:30-3:45pm CT), we will have synchronous classes in BlackBoard on Canvas, during which the instructors will lecture, the class will enagage in Q&A, quizzes, and discussions. We will also use Piazza for asynchronous discussions.

During lecture hours: Each lecture will be a series of short mini-lectures. The lecture will be divided into three blocks. In each block, the instructor will lecture using BBCollaborate Ultra, pause for interactive Q&A, and deliver short quiz questions to clear up any confusion before proceeding to the next block. All content will be recorded and be made available afterwards to watch asynchronously outside of the lecture time. We would like, whenever possible, all students to watch the content during class time, post questions on Piazza during the lecture, and participate in the quiz. In order to be part of the class asynchronously, instructors must be contacted and approve.

We will use Piazza for real-time Q&A during lectures. Please follow these rules:

- Please check if someone has posted the same / similar question before you; it's much easier if we build on the thread.
- Use an informative "Summary" line to help others.

In summary: In class you will attend real-time mini-lectures by the instructor, ask / discuss questions on Piazza, and take short quizzes as a poll for student understanding.

INSTRUCTORS AND TEACHING ASSISTANTS (TAs)

Instructor

Fred SALA
FSALA@WISC.EDU

Instructor Availability and Preferred Contact

Instructors, TAs, and peer mentors will hold office hours in BBCollaborate Ultra.

The detailed office hours are available on the course website: http://pages.cs.wisc.edu/~sharonli/courses/cs540_spring2021/index.html

TA Availability and Preferred Contact

See our course website: http://pages.cs.wisc.edu/~sharonli/courses/cs540_spring2021/index.html

COURSE OUTCOMES, GRADING, and OTHER COURSE MATERIALS

Course Learning Outcomes (CLOs)

- Understand and be able to apply the foundational tools in machine learning & AI: linear algebra, probability, logic, and elements of statistics.

  S37343

- Understand core techniques in natural language processing (NLP), including bag-of-words, tf-idf, n-gram models, and smoothing.

  S37414

- Understand the basics of machine learning. Identify and summarize important features in supervised learning and unsupervised learning.

  S37415

- Distinguish between regression and classification. Understand basic algorithms: linear regression, k-nearest neighbors, and naive Bayes.

  S37416

- Understand the basics of neural networks: network architecture, training, backpropagation, stochastic gradient descent. Learn aspects of deep learning, including deep architectures, convolution, training techniques.

  S37417

- Understand the fundamentals of game theory, how to formulate and solve several types of search problems, and basic elements of reinforcement learning

  S37418

- Consider how AI & ML problems are applied in real-world settings and the ethics of AI.

  S37419

Grading

The following weights are used:

- Midterm Exam: 15%
- Final Exam: 15%
- Homework Assignments: 70%

At the end of the semester, the final letter grades are given based on an approximate curve. The weights placed on the assignments will be strictly enforced.

The final letter grade will be assigned based on the percentile of the averaged points in the class:

- A: Top 15-25% of course grades
- AB: next 15-25%
- B: next 0-20%
- BC: next 0-20%
- C: next 0-20%
- D/F: 0-5%

As student performance may vary from semester to semester, the instructors reserve the right to adjust this distribution. McBurney Center students should contact the instructors to specify any special requests for the exams or homework assignments together with the supporting documentation provided by the McBurney Center. We will do our best to accommodate the requests.

Course Website, Learning Management System and Digital Instructional Tools

All details are available on the course website: http://pages.cs.wisc.edu/~sharonli/courses/cs540_spring2021/index.html

Discussion Sessions (in-person or remote)

We will use Piazza for real-time Q&A during lectures, as well as for asynchronous discussions.

- Please check if someone has posted the same / similar question before you; it's much easier if we build on the thread.
- Use an informative "Summary" line to help others.

Required Textbook, Software, & Other Course Materials

The following textbook is optional, but may be useful: Artificial Intelligence: A Modern Approach (4th edition). Stuart Russell and Peter Norvig. Pearson, 2020. ISBN 978-0134610993.

Homework & Other Assignments

Homework assignments include written problems and programming (in Python).

Frequently-asked questions (FAQs) on homework assignments will be posted on Piazza.

Homework is always due the minute before class starts on the due date. Late submissions will not be accepted. Assignment grading questions must be raised with the TAs within 72 hours after it is returned. Note that a regrading request for a part of a homework question may trigger the grader to regrade the entire homework and could potentially take points off. Regrading will be done on the original submitted work, no changes allowed.

The TWO lowest homework scores are dropped from the final homework average calculation. This drop is meant for emergency usage. Additional drops, late days, or homework extensions will not be provided. We encourage you to use a study group for doing your homework. Students are expected to help each other out, and if desired, form ad-hoc homework groups. However, each student must produce and turn in their own, unique work.

Potential updates on the policy will be posted on the course website.

Campus Spaces for Virtual Learning & Testing

Dedicated on-campus spaces with high-speed internet are available for students to reserve for any exam/quiz taken during the semester. Computers can also be requested.

EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

Exams, Quizzes, Papers & Other Major Graded Work

There will be a midterm exam and a final exam. All exams will be conducted online through Canvas. Makeup exams will not be scheduled. Please plan for exams at these times and let us know about any exam conflicts during the first two weeks of the semester. If an emergency arises that conflicts with the exam times, email us as soon as possible. Emergency exam conflicts will be handled on a case-by-case basis.

Exam grading questions must be raised with the instructor within 72 hours after the exam is returned. If a regrade request is submitted for a part of a question on the exam, the grader reserves the right to regrade the entire exam and could potentially take points off.

Potential updates on the policy will be posted on the course website.

ADDITIONAL COURSE INFORMATION AND ACADEMIC POLICIES

Privacy of Student Information & Digital Tools: Teaching & Learning Analytics & Proctoring Statement

The privacy and security of faculty, staff and students' personal information is a top priority for UW-Madison. The university carefully reviews and vets all campus-supported digital tools used to support teaching and learning, to help support success through learning analytics, and to enable proctoring capabilities. UW-Madison takes necessary steps to ensure that the providers of such tools prioritize proper handling of sensitive data in alignment with FERPA, industry standards and best practices.

Under the Family Educational Rights and Privacy Act (FERPA – which protects the privacy of student education records), student consent is not required for the university to share with school officials those student education records necessary for carrying out those university functions in which they have legitimate educationl interest. 34 CFR 99.31(a)(1)(i)(B). FERPA specifically allows universities to designate vendors such as digital tool providers as school officials, and accordingly to share with them personally identifiable information from student education records if they perform appropriate services for the university and are subject to all applicable requirements governing the use, disclosure and protection of student data.

Privacy of Student Records & the Use of Audio Recorded Lectures

See information about privacy of student records and the usage of audio-recorded lectures.

Lecture materials and recordings for this course are protected intellectual property at UW-Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

How to Succeed in This Course

Resource links to other campus services:

- University Health Services
- Undergraduate Academic Advising and Career Services
- Office of the Registrar
- Office of Student Financial Aid
- Dean of Students Office

Course Evaluations

Students will be provided with an opportunity to evaluate this course and your learning experience. Student participation is an integral component of this course, and your confidential feedback is important to me. I strongly encourage you to participate in the course evaluation.

Digital Course Evaluation (AEFIS)

UW-Madison uses an online course evaluation survey tool, AEFIS. In most instances, you will receive an official email two weeks prior to the end of the semester when your course evaluation is available. You will receive a link to log into the course evaluation with your NetID where you can complete the evaluation and submit it, anonymously. Your participation is an integral component of this course, and your feedback is important to me. I strongly encourage you to participate in the course evaluation.

Students' Rules, Rights & Responsibilities

During the global COVID-19 pandemic, we must prioritize our collective health and safety to keep ourselves, our campus, and our community safe. As a university community, we must work together to prevent the spread of the virus and to promote the collective health and welfare of our campus and surrounding community. Rights & Responsibilities

UW-Madison Badger Pledge

Campus Guidance on the use of Face Coverings

Face coverings must be correctly worn on campus at all times and in all places (both outside and inside), except by students in their assigned residence hall rooms; by employees when alone in a private, unshared lab or office; when traveling alone in a private vehicle; and when exercising outside in a way that maintains 6 feet of distance from other people.

Students with disabilities or medical conditions who are unable to wear a face covering should contact the McBurney Disability Resource Center or their Access Consultant if they are already affiliated. Students requesting an accommodation unrelated to disability or medical condition, should contact the Dean of Students Office.

Students who choose not to wear a face covering may not attend in-person classes, unless they are approved for an accommodation or exemption. All other students not wearing a face covering will be asked to put one on or leave the classroom. Students who refuse to wear face coverings appropriately or adhere to other stated requirements will be reported to the Office of Student Conduct and Community Standards and will not be allowed to return to the classroom until they agree to comply with the face covering policy. An instructor may cancel or suspend a course in-person meeting if a person is in the classroom without an approved face covering in position over their nose and mouth and refuses to immediately comply.

Quarantine or Isolation Due to COVID-19

Student should continually monitor themselves for COVID-19 symptoms and get tested for the virus if they have symptoms or have been in close contact with someone with COVID-19. Student should reach out to instructors as soon as possible if they become ill or need to isolate or quarantine, in order to make alternate plans for how to proceed with the course. Students are strongly encouraged to communicate with their Instructor concerning their illness and the anticipated extent of their absence from the course (either in- person or remote). The instructor will work with the student to provide alternative ways to complete the course work.

Diversity & Inclusion Statement

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

Academic Integrity Statement

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

Accommodations for Students with Disabilities

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty, will work either directly with the student or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: McBurney Disability Resource Center)

Academic Calendar & Religious Observances

See: https://secfac.wisc.edu/academic-calendar/#religious-observances