

CSE 4308 - Fall 2016 - Syllabus

Artificial Intelligence I

Course web page: http://vlm1.uta.edu/~athitsos/courses/cse4308_fall2016

Lecture times: MW 1:00pm-2:20pm

Classroom: GACB 103

Textbook: S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", third edition (2009), Prentice Hall.

Instructor:

[Vassilis Athitsos](#)

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Office telephone: 817-272-0155

Office hours: TuTh 3:30pm-5:00pm

Teaching assistant (GTA):

TBD

E-mail: TBD

Office: TBD

Office hours: TBD

Course Description

Description of Course Content: This course gives an introduction to the philosophies and techniques of Artificial Intelligence. AI techniques have become an essential element in modern computer software and are thus essential for a successful career and advanced studies in computer science. Students successfully completing this course will be able to apply a variety of techniques for the design of efficient algorithms for complex problems. Topics covered in this course include search algorithms (such as breadth-first, depth-first, A*), game-playing algorithms (such as Minimax), knowledge and logic reasoning, planning methods (such as STRIPS and Graphplan), probabilistic reasoning, and machine learning.

Prerequisites: Programming Languages (CSE 3302) and Theoretical Concepts (CSE 3315).

Student Learning Outcomes: After successfully taking this course, a student should be familiar with standard approaches to artificial intelligence, be able to discuss pros and cons of these approaches, and be able to apply basic artificial intelligence methods.

Assignments

There will be several programming and written assignments in this course. All assignments have equal weight. No assignment scores will be dropped. The following class policies regarding assignments will be followed:

- Programming assignments have to run on the ACS machine *omega*, unless permission is obtained via e-mail from the instructor or the teaching assistant.

- All assignments must be submitted via [Blackboard](#).
- No deadline extensions for the entire class will be provided. (See syllabus about policy on extensions for individuals, based on emergencies documented in writing).
- No extra credit will be provided.
- If you make multiple submissions to Blackboard for the same assignment, only the latest submission will be graded.
- **After you submit your solutions, you should download them and make sure that you submitted the correct files.** Every semester, several students ask for leniency, claiming that they did the assignment, but accidentally submitted the wrong files. These claims are often legitimate, but, unfortunately, no grade leniency will be accorded to such claims. It is each student's responsibility to doublecheck their submissions.
- **If, for whatever reason, you cannot submit on Blackboard, e-mail your solution to the instructor and ALL teaching assistants, from your UTA account, BEFORE the submission deadline.** This will serve as proof that you did the work. You still have to offer a very convincing explanation as to why you were not able to submit on Blackboard.

Students are allowed to work with other CSE 4308 students on the assignments. At the same time, learning to solve problems on your own is the most important practice for the midterm and final exams. Students are welcome, and strongly encouraged, to work on the posted practice problems as well.

Late submission policy:

- All assignments are graded out of 100 points. Assignments submitted late will be penalized, at a rate of 4 penalty points per hour. The submission time will be the time shown on Blackboard. Any assignment submitted more than 25 hours late will receive no credit.
- Exceptions to late submission penalties will only be made for emergencies documented in writing, in strict adherence to UTA policy. For all such exception requests, the student must demonstrate that he or she made all efforts to notify the instructor as early as possible.
- Computer crashes, network crashes, software or hardware failure, Blackboard failure, e-mail failure, will NOT be accepted as justification for late submissions. If you want to minimize chances of a late submission, aim to submit early. You can always revise your submission till the deadline.
- Sometimes students submit the wrong files on Blackboard. Unfortunately, no credit or waiver of late penalties can be provided in such cases.
- If you find yourself in an emergency situation and can not deliver a homework on time, immediately inform the instructor and teaching assistant. Even if you have a valid reason for delivering late an assignment, you must make a convincing case that you have notified the instructor and teaching assistant as early as possible.

If you want to minimize chances of a late submission, aim to submit early. You can always revise your submission till the deadline.

Exams

There will be three midterms in this course. All exams will have equal weight. No exam scores will be dropped.
No make-up exams will be offered.

All exams are open-book, and students are free to bring any printed or handwritten material (textbooks, notes, etc.) to consult during the exam. Students will not be allowed to bring in any electronic aids, including pocket calculators, laptops, cell phones, or e-books.

Students are not allowed to talk or otherwise communicate with other students during an exam.

Absence from exams may be excused, with appropriate documentation, for illness, critical family emergencies, military service obligations, observance of major religious holidays, and certain university service commitments. Car or transportation problems will NOT be considered a legitimate reason to miss an exam. **Requests for excused absence, and documentation for such absences, must be provided as soon as possible. Even if the reason for an absence is valid, a request for an excused absence will be rejected if provided unjustifiably late.**

Attendance Policy

At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I will follow the following attendance policy: Attendance is mandatory for exams (midterms and final), but NOT for lectures. Attendance in lectures will NOT be used in calculating the semester grade. However, students are responsible for the material covered in the lectures. The instructor and teaching assistants will NOT honor requests to fill students in on what they missed in class, unless the absence was justified by an emergency.

Attendance is required for exams. Absences for exams will only be excused for medical or other emergencies, in strict adherence with UTA policy. All emergencies must be reported as early as possible and **documented in writing**. No make-up exams will be given.

Transportation problems (e.g., flat tires) will NOT be considered a valid excuse for missing exams. To ensure attendance, plan to arrive to class well in advance, and have backup transportation plans available.

While UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

Class Participation

Class participation is optional, and will not be considered for the course grade. At the same time, students are highly encouraged to participate, by asking questions, as well as answering questions by the instructor. Class participation can be an important resource for students who have difficulty understanding any part of the course material.

Grading

Assignment scores and exam scores are converted to letter grades based on the following scale:

- A: 90%
- B: 80%
- C: 70%
- D: 60%

- F: below 60%.

The instructor reserves the right to lower these thresholds, based on the distribution of scores and the degree of difficulty of the assignments and exams.

At the end of the semester, the course grade will be computed based on the following steps:

1. The average of all assignment scores will be converted to a letter grade.
2. The average of all exam scores will be converted to a letter grade.
3. The LOWEST of those two letter grades will be the semester grade for the course.

For example, if a student receives an F for the assignments and an A for the exams, the semester grade will be an F. Similarly, if a student receives an F for the exams and an A for the assignments, the semester grade will be an F.

Any request for re-grading (for an assignment or midterm exam) must be made within 5 days of receipt of that grade. Re-grading can lead to a higher or lower grade, depending on grading errors that are discovered.

IMPORTANT: It should be clear to every student that course grades will depend EXCLUSIVELY on the above grading criteria. Students should not request nor expect any other factor to be considered in computing the course grade. For example, factors that will NOT be considered are: need of a better grade to keep financial aid, to stay in the program, or to graduate. Students are expected to carefully monitor their own performance throughout the semester and seek guidance from available sources (including the instructor) if they are concerned about their performance and the course grade that they will earn.

Withdrawals

The university withdrawal policy will be strictly adhered to. Up to the initial withdrawal date, all students will receive a W. After that date, the grade will be determined by the student's current average, and a WF or WP assigned as appropriate.

Expectations for Out-of-Class Study

Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend an additional minimum of 10 hours per week of their own time in course-related activities, including reading required materials, completing assignments, solving practice questions, and preparing for exams. More time may be needed for people having difficulties understanding the material. People with relatively weak mathematical background are expected to have more difficulties understanding the material, and to need more out-of-class study time.

Emergency Exit Procedures

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. The classroom has two doors, which are located on the left and the right side of the classroom (the left and right side of the classroom are defined assuming that you are facing the projection screen).

- Safely and calmly exit the classroom using either of the two doors.
- If exiting from the left door, turn left, and walk towards the exit, which is about 75 feet away from the door.
- If exiting from the right door, turn right, and walk towards the exit, which is about 75 feet away from the door.

When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

University Policies and Services

Grade Grievances:

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current undergraduate and graduate catalogs.

Drop Policy:

The standard UTA drop policy applies to this course. Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/ses/fao>).

Disability Accommodations:

UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

- The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364.
- Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Non-Discrimination Policy:

The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX Policy:

The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity:

All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, paragraph 2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Student Support Services:

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Electronic Communication:

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Campus Carry:

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University

establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey:

At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week:

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Course Schedule

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. The following schedule is tentative, and will be regularly updated.

Lectures Schedule

| Lecture | Date | Chapters, 2nd Edition | Chapters, 3rd Edition | Slides | Topic |
|---------|--------------|-----------------------------|-----------------------------|---|---|
| 1 | Mon 08/29 | 1, 3 | 1, 3.1- 3.4 | Overview of Syllabus Introduction ((c)S. Russel) Uninformed Search ((c)S. Russel) | Course Details and Overview Solving Problems by Search |
| 2 | Wed 08/31 | 4 | 3.5-3.6 | Informed Search ((c)S. Russel, Cook) Implementation Notes (instructor slides) | Informed Search |
| 3 | Mon 09/05 | 2 | 2 | | Search, continued. |
| 4 | Wed 09/07 | 6 | 5 | Game Playing ((c)S. Russel) Alpha-Beta Example (instructor slides) | Game Playing |
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|----|--------------|-----------------|-----------------|--|---|
| 5 | Mon 09/12 | 7 | 7 | Logic and Inference ((c)S. Russel) Explaining TT-Entails (instructor slides) | Knowledge and Logic Reasoning |
| 6 | Wed 09/14 | 7 | 7 | | Inference |
| 7 | Mon 09/19 | 7 | 7 | | Inference, continued |
| 8 | Wed 09/21 | 7 | 7 | | Inference, continued |
| 9 | Mon 09/26 | 8.1-8.3, 9.1 | 8.1-8.3, 9.1 | First-Order Logic | First-Order Logic |
| 10 | Wed 09/28 | First Midterm | | | |
| 11 | Mon 10/03 | 11 | 10 | Planning (instructor slides) Planning (textbook slides) ((c)S. Russel) | Planning |
| 12 | Wed 10/05 | 12 | 11 | Non-Deterministic Planning (instructor slides) Non-Deterministic Planning (textbook slides) ((c)S. Russel) | Contingency Planning, Online Replanning |
| 13 | Mon 10/10 | 13 | 13 | Probability ((c)S. Russel) | Probability |
| 14 | Wed 10/12 | 13 | 13 | | Probability, continued |
| 15 | Mon 10/17 | 13 | 13 | Priors and Posteriors (instructor slides) | Prior and Posterior Probabilities |
| 16 | Wed 10/19 | 14.1- 14.4 | 14.1- 14.4 | Bayesian Networks ((c)S. Russel) Bayesian Networks (instructor slides) | Bayesian networks |
| 17 | Mon 10/24 | 18.1- 18.3 | 18.1- 18.3 | Learning (instructor slides) | Machine Learning. |
| 18 | Wed 10/26 | 14.1- 14.4 | 14.1- 14.4 | | Midterm preparation, Learning (continued) |
| 19 | Mon 10/31 | Second Midterm | | | |
| 20 | Wed 11/02 | 18.1- 18.3 | 18.1- 18.3 | Learning ((c)S. Russel) Decision Trees (instructor slides) | Decision Trees |
| 21 | Mon 11/07 | 18.1- 18.3 | 18.1- 18.3 | Practical Issues with Decision Trees (instructor slides) | Decision Trees (continued) |
| 22 | Wed 11/09 | | 20.3 | Estimating Probabilities (instructor slides) | Bayesian Classifiers, Probability Estimation |
| 23 | Mon 11/14 | | 20.3 | | Probability Estimation |

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|----|--------------|---------------|-----------------|--|------------------------------------|
| 24 | Wed 11/16 | | 18.8.1 | Nearest Neighbors (instructor slides) | Nearest Neighbor Classifiers |
| 25 | Mon 11/21 | 20.5 | 18.6.4, 18.7 | Neural Networks ((c)S. Russel) Backpropagation (instructor slides) | Neural Networks |
| 26 | Wed 11/23 | 20.5 | 18.7 | | Neural Networks, continued. |
| 27 | Mon 11/28 | | | | Overview of Material for Midterm 3 |
| 28 | Wed 11/30 | Third Midterm | | | |
| 29 | Mon 12/05 | Midterm Recap | | | |
| | Wed 12/07 | No class | | | |

Assignments Schedule

- Assignment 1. Due date: Fri 09/09, 5:00pm.
- Assignment 2. Due date: Fri 09/16, 5:00pm.
- Assignment 3. Due date: Fri 09/23, 5:00pm.
- Assignment 4. Due date: Fri 10/07, 5:00pm.
- Assignment 5. Due date: Fri 10/14, 5:00pm.
- Assignment 6. Due date: Fri 10/21, 5:00pm.
- Assignment 7. Due date: Fri 11/04, 5:00pm.
- Assignment 8. Due date: Fri 11/11, 5:00pm.
- Assignment 9. Due date: Fri 11/18, 5:00pm.

Exams Schedule

- First midterm, Wed 09/28.
[Chapters covered and practice questions.](#) [Answers.](#)
You can also see questions from two midterms given in previous years:
 - [First sample midterm](#). On average, the questions here are relatively easy. For the answers [click here](#).
 - [Second sample midterm](#). On average, the questions here are relatively hard. For the answers [click here](#).
- Second midterm, Mon 10/31.
[Chapters covered and practice questions.](#) [Answers.](#)
You can also see sample midterm questions used in previous years:
 - [Sample midterm questions](#). For the answers [click here](#).

- Third midterm: Wed, 11/30.

[Chapters covered and practice questions.](#) [Answers.](#)

You can also see sample midterm questions used in previous years:

- [Sample midterm.](#) For the answers [click here.](#)

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. The non-emergency number is 817-272-3381.