

CS 332: Introduction to Artificial Intelligence
Section 1: TThu 11:00am – 12:15am. Hyer 210
Course Syllabus

Dr. Hien Nguyen.
 Email: nguyenh@uww.edu
 Office: MG 106
 Office Hours: 12:30pm-2:00 pm TuTh, 11:00-12:30pm MW, or by appointment
 Phone: 262 472 5170
 Class website: D2L

Welcome Welcome to CS 332, Introduction to Artificial Intelligence. In this course, we will focus on introduction of the basic artificial intelligence principles including simple representation schemes, problem solving paradigms, constraint propagation, search strategies, and learning approaches. Knowledge representation, natural language processing, gaming, machine learning and user modeling will also be explored.

Reference Texts Artificial Intelligence: A Modern Approach (3rd Edition) (Prentice Hall Series in Artificial Intelligence). 2009. ISBN: 0136042597
 (electronic file of this book will be posted in D2L)

Course Description This course will introduce the basic principles in artificial intelligence. It covers simple representation schemes, problem solving paradigms, constraint propagation, search strategies, and learning approaches. Areas of application such as knowledge representation, natural language processing, gaming, machine learning and user modeling will be explored. This course is intended for students who have at least one high-level language and have written computer programs of at least moderate complexity.

Prerequisite: COMPSCI 220 or COMPSCI 222 (Note that a student may not register for any course which is a pre-requisite for another course in which credit has been earned unless prior departmental approval is obtained)

Course Objectives

1	Given a basic Artificial Intelligence(AI) problem such as search, gaming, planning, machine learning, understand the theory, and implement algorithms being used to solve this problem.
2	Given a real world problem, be able to identify the parts in which AI techniques can be applied.

Course Schedule

Tentative Course Schedule

WEEK	READINGS Assignment	Description	Project/Exams
1	Part 1, 1.1 to 1.4	Introduction to AI The focuses are the introduction to AI, highlight the inter-disciplinary nature of AI (relations with other fields such as psychology, mathematics, sociology), review the traditional AI and modern AI approaches and subfields. Lastly, we will learn how AI is used in software applications.	Homework 1
2	Part 1, 2.1 to 2.4	Intelligence Agents	Project 1 (search

		The focuses are the representation of agent environment and agent behaviors; structure of intelligent agents; communication among agents. We discuss the design and implementation of an automated, intelligent agent.	problems)
3	Part 2, (3.1, 3.3, 3.4, 3.6;4.1, 4.2)	Problem solving by Searching The focuses are the problem solving agents; the use of searching algorithms for solutions; algorithm and complexity analyses of uninformed searches and informed searches including depth first search, breadth first search, A* search.	Homework 2
4	Part 2 (4.5)	Online search The focuses are the description of online search; the challenges faced by development of algorithms for online search; and the use of intelligent agents to develop personalized, online search.	Project 1 is due.
5	Part 2 (6.1-6.8)	AI for games The focuses are the optimal decision in game development; imperfect, real-time decision. Specifically, the minimax algorithm, alpha-beta pruning technique will be discussed. At the end, evaluation functions and cut-off search as well as state of the art game programs are studied.	Homework 3 Project 2 (AI game theory)
6		Finite State machine The focuses include the presentation on what finite state machine is, how to implement finite state machine for game development. Students will study a specific example of implement a simple game using finite state machine.	Homework 4
7	Part 3 (7, 8,9)	Logical Agents The focuses include the introduction of first order logic and inference on first order logic; representation of a knowledge base using first order logic in a specific application.	Homework 5
8	Part 3 (10)	Knowledge Representation The focuses are the representation and reasoning techniques of basic knowledge representation schemes (rule-based, action-based, and situation-based), discussion of online applications using those knowledge representation techniques.	Group project
9	Part 3 (10)	Knowledge Representation The focuses are the construction and representation of ontology; use of ontology in real-world applications	Homework 6

Grading Policies

		Midterm Exam	
10- 11	Part 5 (14,15)	Bayesian Networks The focuses are to create, update Bayesian networks for a real-world application, set evidences, perform belief update, and perform belief revision.	Group project
12-15	Part 6 (18, 19)	Machine Learning The focuses are to create decision tree from observations, choose attribute sets, assess performance of a learning algorithm, and size of training set	Homework 7
	Part 6 (20)	Statistical Learning Methods The focuses are to understand fundamental learning models including naïve Bayes model, learning with hidden Markov model, nearest-neighbor model; apply these models to solve a real world problem.	Homework 8
16	Exam week	Final exam	TBA

Grading Policy

GRADABLE	Percentage
3 Projects	50%
8 Homeworks	25%
Midterm exam	10%
Final exam	15%
Total	100%

Letter Grade	Percentage	Letter Grade	Percentage
A	94 to 100%	A-	90 to 93%
B+	87 to 89%	B	84 to 86%
B-	80 to 83%	C+	77 to 79%
C	74 to 76%	C-	70 to 73%
D+	67 to 69%	D	64 to 66%
D-	60 to 63%	F	Less than 60%

Evaluation Criteria of projects

- **Timeliness:** The assignment is completed on time. Please see policy for late assignments below. Deadlines are given for all assignments.
- **Completeness:** All parts of a given assignment are to be submitted at the same time. However, if you have not completed an assignment by the time it is due, you are better off submitting what you have rather than nothing.
- **Accuracy:** The assignment has been completed according to the directions given. The

Course Policies and Procedures

- deliverable delivered is what was asked for. Program needs to be run-able.
- **Content:** the format of the content will be given for each assignment and exam. These guidelines need to be followed closely.

Homework

Homework is worth 25% of your grade and the due dates will be given in class. Students are expected to attend classes regularly. The instructor reserves the right to excuse an absence or deny an excused absence at his discretion. All requests for an excused absence should be made in writing and should be supported by appropriate documentation explaining reason for absence. Students are responsible for the portion of the material covered in class and any homework given during the semester. **Classroom etiquette requires you come to class on time, remain until class ends, and not maintain a conversation, not using IM, Facebook or emails while the instructor or another student is speaking.** Read assigned chapters from the textbook and supplementary material as assigned

Projects

All the projects are due by the deadline given in each assignment. Students will be submitted each project by dropping it at the dropbox in D2L before or by the due date. Specific guidelines for submitting projects will be delivered by the time they are issued. **Two projects are individual work and there should be no team work for these projects. Codes and reports that are detected to be identical or more than 80% similar with each other will be given zero credits for all parties involved. There is one group project and group assessment will be given to individual team members to evaluate how each member contributes to the final project.**

Late Project

Each late project (except the last project) is penalized 5% for each day it is late. Because one of the goals of the class is to train students to be familiar with professional software development environment, **deadline is strictly followed** in this course. **The instructor will NOT accept any late submission for the last project because of the time required to grade a project in this class and the time constraints reinforced by the school to submit the final grade.**

Exam policy/Make-ups:

I will check student ID before midterm and final exams. A missed exam will count as zero unless the reason for missing the exam is approved by me as a valid excuse. This approval should be gained in advance except in cases of emergency. An exam missed for an approved reason will simply not figure into computing the grade for the course.

Religious Beliefs Accommodation

Board of Regents policy states that students' sincerely held religious beliefs shall be reasonably accommodated with respect to scheduling all examinations and other academic requirements. Students must notify the instructor, within the first three weeks of the beginning of classes, of the specific days or dates on which they will request accommodation from an examination or academic requirement. For additional information, please refer to the section in the [University Bulletin](#) and the [Timetable](#) titled "Accommodation of Religious Beliefs."

Academic Misconduct

The University believes that academic honesty and integrity are fundamental to the mission of higher education and of the University of Wisconsin System. The University has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards are subject to disciplinary action. UWS

Chapter 14 identifies procedures to be followed when a student is accused of academic misconduct. For additional information, please refer to the section in the Student Handbook titled "Student Academic Disciplinary Procedures."

Absence for University-Sponsored Events:

University policy adopted by Faculty Senate and the Whitewater Student Government states that students will not be academically penalized for missing class in order to participate in university-sanctioned events. They will be provided an opportunity to make up any work that is missed; and if class attendance is a requirement, missing a class in order to participate in a university-sanctioned event will not be counted as an absence. A university-sanctioned event is defined to be any intercollegiate athletic contest or other such event as determined by the Provost. Activity sponsors are responsible for obtaining the Provost's prior approval of an event as being university-sanctioned and for providing an official list of participants. Students are responsible for notifying their instructors in advance of their participation in such events.

University Statement

The University of Wisconsin—Whitewater is dedicated to a safe, supportive and non-discriminatory learning environment. It is the responsibility of all undergraduate and graduate students to familiarize themselves with University policies regarding Special Accommodations, Misconduct, Religious Beliefs Accommodation, Discrimination and Absence for University sponsored events. (For details, please refer to the Undergraduate and Graduate Timetables; the "Rights and Responsibilities" section of the Undergraduate Bulletin; the Academic Requirements and Policies and the Facilities and Services sections of the Graduate Bulletin; and the "Student Academic Disciplinary Procedures" [UWS Chapter 14]; and the "Student Nonacademic Disciplinary Procedures" [UWS Chapter 17]).

Technology requirement

The following applications will be used in class:

Either Java Development Kit (JDK) Or C++ (Linux version). **If you plan to use C++ in Linux and would like an account on stuwork1.uww.edu, please let me know immediately.**

Weka (machine learning): <http://www.cs.waikato.ac.nz/ml/weka/>

Genie/Smile (free download for Bayesian networks) from <http://genie.sis.pitt.edu/>

My preferences

I have tried to detail all course requirements in the syllabus, and I urge you to read the syllabus thoroughly and keep a copy of it handy for your review.

You can always reach me through e-mail (nguyenh@uww.edu). When I am not traveling, I usually check my e-mail several times a day, so there is a great chance that I would reply to your message promptly.