



JOINT INSTITUTE  
交大密西根学院

## Course Syllabus

### VE492 Introduction to Artificial Intelligence

### Summer 2021

#### Course Description:

Introduction to the core concepts of AI, organized around building computational agents. Emphasizes the application of AI techniques. Topics include search, logic, knowledge representation, reasoning, planning, decision making under uncertainty, and machine learning.

#### Instructor:

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#### Teaching Assistants:

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#### Textbook (Recommended but not required):

*Artificial Intelligence: A Modern Approach*, by Russell and Norvig, Prentice Hall, Third Edition, 2009.

#### Class Webpage:

Log into Canvas at <https://umjicanvas.com/courses/2051>. Lecture slides, assignments, and grades will be posted on the class webpage. Check also Piazza for discussions.

#### Course Prerequisites:

You should have taken VE281. I will assume that you are comfortable with basic data structures (e.g., linked-lists, trees, graphs) and the basic operations on them.



## Grading Policy:

There will be about 10 homeworks, five graded programming projects, one midterm exam, and one final exam. The grading distribution is:

|               |     |
|---------------|-----|
| Participation | 5%  |
| Homework      | 15% |
| Projects      | 30% |
| Midterm Exam  | 25% |
| Final Exam    | 25% |

Participation includes attendance, answering quizzes (although wrong answers are not penalized), activity on Piazza (good questions/answers/comments will be rewarded as bonus), and online etiquette.

Any questions about the grading of the projects or exams must be brought to the attention of your TAs and the instructor **within one week** after the item is returned.

## Graded Assignments

### 1. Late Submission Policy

All assignments are expected to be submitted by their due dates and times. They normally lose 20% of their total point values per day turned in late. See extensions, slip days, and homework drop policies.

### 2. Extensions

Extensions are only granted exceptionally for documented medical reasons or personal emergencies that you could not have anticipated. In such cases, please contact the instructor (not the TAs) in person before the submission is due. If you cannot see the instructor in advance due to the emergency, then see him as soon as you possibly can. In all cases, you will be required to substantiate any extension request with written proof of the emergency. Extensions are not granted for reasons such as accidental erasure/loss of files and outside conflicting commitments. In order to prevent accidental erasure/loss, make sure that you make copies of your files frequently.

## Projects

### 1. Programming Environment

We require you to develop your programs in Python 3.6. We will grade your programs in the Linux environment: they must run correctly on this operating system.



## 2. Project Grading

Projects will by default be graded automatically for correctness, though we will review projects individually as necessary to ensure that they receive the credit they deserve. Projects can be submitted as often as you like; we strongly encourage you to keep working until you get a full score.

## 3. Project Slip Days

Programming projects must be turned in electronically by 11:59 pm on the due date (See Late Policy). However, projects also have slip days which can be used to delay the onset of the late policy.

You will have a total of **5 slip days** to be used across **ALL** projects to extend a deadline. Note that slip days are counted by the granularity of days, rounded up to the nearest day. For example, if you have yet to use your two slip days: for a project due at 11:59 pm on Friday, any submission from Saturday 0:00 am to Saturday 11:59 pm will use up one slip day, any submission from Sunday 0:00 am to Sunday 11:59 pm will use up two slip days, and any submissions after Monday 0:00 am will begin being penalized by the late policy. Slip days will be applied to your grades at the end of the semester in a manner which maximizes your project grades. **You may only use maximum two slip-days per project.**

## Homework

### 1. Electronic Component of Homework

Electronic homework (submitted on Online Judge) is meant to reinforce and give practice with concepts covered in class. They will be automatically graded for correctness, and you can submit as many times as you like up to the deadline; again we encourage you to work until you have fully solved the homework.

### 2. Written Component of Homework

Written homework (submitted through Canvas) is meant to make you think beyond strict repetition of what is covered in class and is a sample of the kind of assessment material you will see on exams.

### 2. Homework Drop Policy

Homeworks have no slip days. However, you will each be allowed to drop your lowest 2 written homeworks and your lowest 2 electronic homeworks. These may be distributed throughout the semester, and do not have to all be from the same homework. (When calculating final grades, this will happen automatically, we'll just use your 8 highest scoring ones for each.)

Note that this (i.e., slip day and drop) policy is also meant to deal with cases like internet issues while submitting, forgetting about the deadline, emergency situations, joining the class late, etc.

## Exam

The exams will be closed book. No electronic devices are allowed in the exams.



You are expected to take both exams at the scheduled times. If you miss an exam, and a medical or personal emergency is not involved, you will receive a zero for that exam. If you anticipate an exam in another course, you must notify the instructor as soon as you are aware of it.

### Academic Integrity:

1. All students are expected to attend all of the classes.
2. All programming assignments must be done by yourself or with your team member. You may discuss the project in oral with other students. However, you may not read/copy others' solutions. In all cases in which we have reason to believe that cheating has occurred, we will submit relevant materials to the Honor Council for evaluation.
3. All the homework assignments must be done and submitted by yourself. You may discuss the questions with other students. However, the submission and the writing should be individual work.
4. Exams will be given under the JI's Honor Code and will require individual efforts.
5. You may not share the solutions of any assignments with other students taking VE492, even after you have finished this course.





## Teaching Schedule (Subject to Change)

| Lecture | Teaching Activities (Topics and Exams)          | Projects               | Homeworks        |
|---------|---|------------------------|------------------|
| 1       | Introduction;                                   | P0: Python Tutorial    |                  |
| 2       | Agents and Environments;                        |                        |                  |
| 3       | Uninformed Search;                              |                        | HW1: Search      |
| 4       | Informed Search;                                | P1: Search             |                  |
| 5       | Search in Games;                                |                        |                  |
| 6       | Game Theory;                                    |                        |                  |
| 7       | Markov Decision Process I;                      |                        | HW2: Game        |
| 8       | Markov Decision Process II;                     |                        |                  |
| 9       | Reinforcement Learning I;                       | P2: Adversarial Search | HW3: MDP         |
| 10      | Reinforcement Learning II;                      |                        |                  |
| 11      | Constraint Satisfaction Problems I;             |                        | HW4: RL          |
| 12      | Constraint Satisfaction Problems II;            |                        |                  |
| 13      | Probability;                                    |                        | HW5: CSP         |
| 14      | Midterm Review;                                 | P3: RL                 |                  |
|         | Midterm Exam;                                   |                        |                  |
| 15      | Bayes Nets: Representation;                     |                        | HW6: Probability |
| 16      | Bayes Nets: Independence;                       |                        |                  |
| 17      | Bayes Nets: Inference;                          | P4: CSP                |                  |
| 18      | Bayes Nets: Sampling;                           |                        | HW7: Bayes Nets  |
| 19      | Bayes Nets: Hidden Markov Models;               |                        |                  |
| 20      | Hidden Markov Models: Particle Filters;         |                        | HW8: HMMs        |
| 21      | Machine Learning I;                             |                        |                  |
| 22      | Machine Learning II;                            | P5: Bayes Nets         |                  |
| 23      | Machine Learning III;                           |                        | HW9: ML          |
| 24      | Knowledge-based Agents and Propositional Logic; |                        |                  |
| 25      | Propositional Inference;                        |                        |                  |
| 26      | First-Order Logic;                              |                        | HW10: Logic      |
| 27      | Classical Planning;                             |                        |                  |
| 28      | Final Review;                                   |                        |                  |
|         | Final Exam;                                     |                        |                  |