

CS 461 – Artificial Intelligence
Syllabus for Spring Semester, 2020
M W F 11:00 – 11:50 am (effective 01/13/2020 - 03/06/2020)
Online (effective 03/23/2020 - 05/06/2020)*

*updated under USI's COVID-19 Recommendation (<https://usi.edu/covid-19/>)

Syllabus Change Policy: This syllabus may be subject to change with reasonable advanced notice.

Course Description: Introduces students to the fundamental concepts and techniques of artificial intelligence (AI). 3 Hours Credit.

Prerequisites: CS311

USI Computer Science Program Goals:

This course supports the expected characteristics, capabilities and skills for computer science graduates in the USI Computer Science program of study in the following ways:

1.) Mastery of CS technical foundations.

Students will continue to build knowledge and understanding of computer science areas including algorithms and design, fundamental programming concepts, fundamental data structures, software development methods, and ethics.

2.) Recognition of common CS themes and principles.

Students will continue to be able to recognize and identify recurring themes (such as abstraction, complexity, and recursion) that present themselves in many diverse computer science domains, recognize and identify recurring principles (such as sharing a common resource, security, and concurrency) that present themselves in many diverse computer science domains, and apply recurring themes and principles where appropriate.

3.) Recognition of interplay between theory and practice.

Students will continue to be able to explain and illustrate how theory and practice influence each other.

4.) Effective problem solving and critical thinking skills.

Students will continue to be able to identify and use relevant concepts, identify and use relevant information, select and use appropriate actions or operations, interpret clearly and logically from prior activities, develop qualitative and quantitative assessment and develop solutions to problems not only in single levels of details, but also multiple levels of detail and abstraction.

5.) Commitment to life-long learning, and professional and ethical responsibility.

Students will continue to be introduced to the concept that they must develop a plan that establishes how they will maintain skills to remain relevant in the CS field, be able to identify cross disciplinary opportunities between CS and other fields, and to recognize, analyze, and address the intellectual, professional, economic, social, legal, ethical, and cultural issues associated with computing.

6.) Effective communication and organizational skills.

Students will continue to be able to make presentations, whether oral, written or electronic communications that are organized, relevant, and customized for the audience using appropriate CS terminology.

7.) Awareness of the broad applicability of computing.

Use of computer science artificial intelligence topics will be explored in numerous areas of practical application.

8.) Awareness of domain-specific knowledge.

Use of computer science artificial intelligence topics will be explored in various other fields.

Course Learning Objectives:

This course, in particular, contributes to the Computer Science Program Learning Objectives in the following ways:

- Identify the fundamental definitions, issues, and philosophical questions in intelligent systems,
- Identify the basic history of artificial intelligence,
- Understand modeling of the real world,
- Understand the role of heuristics in artificial intelligence, Bayesian Learning
- Implement a search and constraint satisfaction utilizing a two-player games,
- Understand and implement knowledge representation and reasoning,
- Implement an advanced search utilizing either a genetic algorithm, simulated annealing, or a local search,
- Understand agents and their applications,
- Understand and implement machine learning and a neural network,
- Identify an AI planning systems.
- Increase critical thinking skills, analytical problem-solving skills and awareness of computer-related ethics.

Instructional Learning Objectives:

This course, in particular, includes instruction in the following knowledge units identified in the ACM Computer Science CS2013 Knowledge Units:

Algorithmic strategies, fundamental data structures and algorithms, discrete probability, intelligent systems fundamental issues and basic search strategies and knowledge representation and knowledge reasoning and basic machine learning and advanced search techniques and reasoning under uncertainty and agents.

Course Materials:

Luger, George F., Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Sixth Edition, Addison-Wesley, 2009.

Evaluation (revised):

Performance in this class will be evaluated on the following basis:

Assignments (3)	50%
Exams (2)	50%
90-100%	A
80-89%	B
70-79%	C
60-69%	D
Under 60%	F

NOTE: Any extra credit will be added to your total exam score.

Tentative Schedule: (Revised, see Blackboard for detailed/updated calendar and material)

Week 1-8:

- Chapters 1-5 including topics in AI search, Representation in AI, Predictive AI using Naïve Bayes.

Spring Break**Week 9-16** (Online course delivery):

- Chapter 11 including topics on Connectionist Machine Learning via Artificial Neural Networks and Multilayer Perceptrons. All lectures will be provided as recorded video lectures with instructions. Students are responsible for keeping track of updated material and due dates on blackboard.
- **Final Exam** (Class project due on 05/01/2020 by 11:59PM): See more instructions under the Exam tab on blackboard.

Further Information to Facilitate Online Learning

Minimum Technical Skills Requirement

Navigating the Blackboard; Commenting and sharing VoiceThread presentation; intermediate level programming skill in C# using Visual Studio or another similar language, be able to download and install Weka tool.

- **Other Technical Requirements**
 - **A Reliable Computer:** a dedicated computer with an updated operating system, such as Windows 7 or later, or Mac OSX.

- **High-Speed Internet Connection:** (e.g. DSL or Cable). All USI online students are required to have a stable high-speed Internet connection. A wired Internet connection is recommended for online meeting, exams, and assignment submission.
- Office 365 (USI login needed) & Adobe Acrobat Reader installed.
- **Supported Web Browser:** Firefox, Google Chrome, or Safari.
- Microphone & Webcam

* More information on the system requirements for taking online courses can be found at [USI Online Learning System Requirements](#)

Minimum Digital Information Literacy Skills Requirement

1. Using online libraries and databases to locate and gather appropriate information
2. Using computer networks to locate and store files or data
3. Using online search tools for specific academic purposes, including the ability to use search criteria, keywords, and filters
4. Properly citing information sources
5. Preparing a presentation of research findings
6. Uploading and downloading appropriate course related files to/from blackboard.

Technical Support

Help Desk Support

Since your professors are not trained as technology experts, they will not be able to assist you with your technical needs. If you have any issues with Blackboard, Zoom, Panopto, VoiceThread, or any other technology, please contact the [Help Desk](#) at (812) 465-1080 or send an email to it@usi.edu. To learn more about the USI helpdesk, please visit [USI IT Help Desk](#)

Additional Training Documentation

- **Blackboard**
- **Zoom**
- **Panopto**
- **VoiceThread**
 - [USI Online Learning VoiceThread Tutorials](#)
 - [VoiceThread How To](#)

Privacy Policies & Accessibility Statements

For detailed information about the privacy policies and accessibility statements of the course technologies, please visit [USI Online Learning Support Services](#)

Academic Support Services

- **Academic Skills**

<http://www.usi.edu/university-division/academic-skills/tutoring/>

This office offers tutoring and learning assistance to help you develop skills to succeed in your academic life. To contact them, please call 812/464-1743 or go to the website above to find the latest tutoring schedule. In addition to tutoring in math and other content areas in Academic Skills, please note that the Writers' Room (ED 1102) provides writing assistance in person and online. To use this service, please contact their office by calling 812/461-5359 or visit their website at <http://www.usi.edu/university-division/academic-skills/tutoring/writers-room>

- **How to Cite Sources (IEEE, ACM, APA, MLA, Chicago, Turabian, etc.)**

<http://ieeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf>

<https://www.acm.org/publications/authors/reference-formatting>

<http://usi.libguides.com/citingsources>

- **Online Learning Library Services**

<https://usi.libguides.com/onlinelearning>

- **Counseling Center**

The Counseling Center is open every Monday through Friday from 8:00 am to 4:30 pm. You'll find the Counseling Center in the Orr Center, Room 1051; their phone number is 812/464-1867 <http://www.usi.edu/counselingcenter/>

- **Disability, and ADA Support**

<http://www.usi.edu/university-division/disabilities>

- **Student Grievances**

<https://www.usi.edu/media/3402299/Grievance-and-Complaints-Procedures.pdf>

- **Additional Student Resources**

The university provides a comprehensive range of support services and activities for students. Please refer to <http://www.usi.edu/students/> for detailed information regarding academic advising, registration, financial aid, student affairs, counseling, career services, etc.

- **University Health Center**-The University Health Center is a full-service clinic offering medical services and health-related information to students, faculty, and staff. It located in the lower level of the Health Professions Center and is open Monday through Friday, 8 am to 4:30 pm. Click on this link to learn more about the [Health Services](#) offered at USI, or to make an appointment, please call 812/465-1250..

- **Financial Aid Office**- Information about current or future financial aid (including the implications of withdrawal from courses) can be obtained from the University Financial Aid Office. The office open is every Monday through Friday from 8:00 am to 4:30 pm; phone 812/464-1767, or email them at finaid@usi.edu

- **Student Basic Needs**

Students who have difficulty affording food on a regular basis or lack a safe place to live and believe this may affect their class performance are encouraged to contact the Dean of Students Office. A list of resources can also be found at www.usi.edu/media/5612733/financial-wellness-resources.pdf.