

# Course Syllabus – Artificial Intelligence

## CSE545 01/02 (Onsite) and 50/51 (Online) - Fall Semester, 2024

<b>Instructor:</b> Dr. Roman V. Yampolskiy  <a href="mailto:roman.yampolskiy@louisville.edu">roman.yampolskiy@louisville.edu</a>	<b>Office Hours:</b> (subject to change) Monday: 14:00 – 15:00, Wednesday: 14:00 – 15:00 <b>Appointments</b> (at least 24 hour notice required)
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**Teaching Assistant:** **Name:** Ahmed Sharafeldeen; **Office:** Lutz Hall 429.  
**Email:** [a.sharafeldeen@louisville.edu](mailto:a.sharafeldeen@louisville.edu)  
**Office Hours:** M, W 11:00-12:00

**Lectures:** Monday, Wednesday, Friday: 1:00 PM – 1:50 PM (DC 117, Onsite Sections)

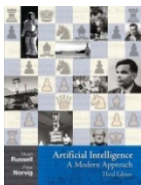
**Prerequisites:** CSE 302 and CSE 310. Ability to program, knowledge of data structures and algorithms, solid mathematical background.

**Course Description:** Topics covered will include rationale and use of heuristic approach to engineering problem solving; information processing models as an explanation of human perceptual, cognitive and affective behaviors. Applications involving the concepts and problems in artificial intelligence engineering.

### Course Objectives:

At the conclusion of this course, a successful student will be able to:

- Explain the main features of an intelligent agent
- Design and implement programs for simple heuristic search problems
- Understand and explain the performance limitations of heuristic search
- Demonstrate an in-depth understanding of at least one AI application area
- Represent simple logic problems as predicate calculus formulae
- Design and implement programs for solving NP-Complete problems
- Be able to design novel algorithms and conduct experiments
- Write research papers and give public presentations
- Understand ethical and philosophical issues associated with AI research



**Textbook:** **Artificial Intelligence: A Modern Approach.** (Third edition) by Stuart Russell and Peter Norvig. Prentice Hall. ISBN-10: 0136042597.

<http://aima.cs.berkeley.edu/index.html>

### **Grading:**

Your course grade will be calculated using the following distribution:

Programming Assignments: 55%  
Research Paper: 15%  
Presentation: 5%  
Participation/ Exercises: 10%  
Midterm Examination: 15%

Graduate Students will have an additional presentation requirement: 10% out of 110%.

98-100 = A+	89-87 = B+	79-77 = C+	69-67 = D+	Below 59 = F
97-94 = A	86-84 = B	76-74 = C	66-64 = D	
93-90 = A-	83-80 = B-	73-70 = C-	63-60 = D-	

\*Percentages between specified ranges default to a lower grade (Ex. 97.6 is an A)

Exams: One mid-term exam will be administered. The exam will be based mainly on the project work you have completed as well as the reading assignments and lectures.

Programming Assignments: The course is designed to require a lot of programming. In total 6 programming projects will be assigned. Each project should be accompanied by a report describing details of the algorithm and results of any experiments performed. Submit your assignments via BlackBoard by combining your source code files and \*.doc file into a single \*.zip archive. The archived file should be named: Project#YourLastName.zip. Example: Your instructor's first project submission would be called **Project1Yampolskiy.zip**. Do NOT password protect your submission.

Research Paper: Students are expected to prepare a paper describing their work on the final Programming Assignment. The paper should be of publishable quality.

Presentation: Students are expected to prepare and present to the class a 15-20 minute presentation about their final Programming Assignment.

Participation: Participation in discussions, and exercises, etc.

Grading questions: If you have a question about a grade, you should contact your TA within one week of the day the graded work is returned to you. You lose the right to re-grading after that. Emails should also work really well and typically will have at most a 24-hour response cycle.

Graduate VS Undergraduate: As this is a co-listed course Graduate Students are expected to do additional work. All *graduate students* will have to present a 30 minute lecture covering one of the chapters in the textbook.

Academic dishonesty: Students are expected to do their own work. **Copying is strictly forbidden.** A primary goal of the Speed School of Engineering is to educate men and women who will serve the engineering community with competence and integrity. Academic dishonesty is a serious offense at Speed School of Engineering because it undermines the bonds of trust and honesty between members of the community and defrauds those who may eventually depend upon our knowledge and integrity. Students are expected to recognize and to uphold standards of intellectual integrity. The J. B. Speed School of Engineering assumes, as a minimum standard of conduct in academic matters, that the student is honest; credit for courses is given and received on the assumption and condition that all work submitted represents the student's own efforts.

Academic dishonesty is defined in the Code of Student Rights and Responsibilities. It is the student's responsibility to become familiar with the Code.

Students with Special Needs:

Students with special needs will be accommodated and all necessary arrangements will be made to facilitate learning the material, doing the assignments, and taking the exams.

Weekly Schedule: Note that the schedule below is tentative and **will be adjusted**.

Week	Lecture Date	Topic	Reading	Assignments
1	Monday, 8/19	<i>Introduction</i>	Ch1	Project 1 assigned
	Wednesday, 8/21	-TSP		
	Friday, 8/23	Programming Project Work		
2	Monday, 8/26	<i>Intelligent Agents</i>	Ch2	<b>Pr1 due</b>
	Wednesday, 8/28	-Exercises 2.3, 2.5, 2.6		Pr2 assigned
	Friday, 8/30	Programming Project Work		
3	Monday, 9/2	<b>Labor Day</b>		
	Wednesday, 9/4	<i>Search</i>	Ch3	
	Friday, 9/6	Programming Project Work		<b>Project 2 due</b>
4	Monday, 9/9	-Exercises 3.10, 3.14, 3.15a,b,c		Project 3 assigned
	Wednesday, 9/11	<i>Beyond Search – GA</i>	Ch4	
	Friday, 9/13	Programming Project Work		
5	Monday, 9/16	- GP		
	Wednesday, 9/18	<i>Adversarial Search</i>	Ch5	
	Friday, 9/20	Programming Project Work		<b>Pr3 due</b>
6	Monday, 9/23	-Exercises 5.8, 5.21		Pr4 assigned
	Wednesday, 9/25	<i>CSPs, -SI(PSO, ACO)</i>	Ch6	
	Friday, 9/27	Programming Project Work		
7	Monday, 9/30	<b>Midterm Break</b>		
	Wednesday, 10/2	-Exercises 6.1,6.2,6.3	Ch7	
	Friday, 10/4	Programming Project Work		
8	Monday, 10/7	<i>Logical Agents</i>		
	Wednesday, 10/9	<i>First-Order Logic</i>	Ch8/9	
	Friday, 10/11	Programming Project Work		
9	Monday, 10/14	<b>Midterm Exam</b>		
	Wednesday, 10/16	<i>WOC, Exam Results</i>		<b>Project 4 due</b>
	Friday, 10/18 <b>W</b>	Programming Project Work		Project 5 assigned
10	Monday, 10/21	-Exercises 8.6,8.15,8.16 (AIMA 2 <sup>nd</sup> ed)		
	Wednesday, 10/23	<i>Artificial Life, CA</i>		
	Friday, 10/25	Programming Project Work		
11	Monday, 10/28	<i>TBD-Student Interest</i>		<b>Pr5 due</b> Pr6 assigned
	Wednesday, 10/30	<i>TBD-Student Interest</i>		Paper/ppt Assigned
	Friday, 11/1	Programming Project Work		
12	Monday, 11/4	<i>TBD-Student Interest</i>		
	Wednesday, 11/6	<i>We Need to Talk about AI (Movie part 1)</i>		
	Friday, 11/8	Programming Project Work		
13	Monday, 11/11	<i>We Need to Talk about AI (Movie part 2)</i>		<b>Final Project (6) due</b>
	Wednesday, 11/13	<i>AI Ethics &amp; Philosophy</i>	Ch26/27	
	Friday, 11/15	Student Projects <b>ppt</b>		
14	Monday, 11/18	Student Projects <b>ppt</b>		
	Wednesday, 11/20	Student Projects <b>ppt</b>		
	Friday, 11/22	Student Projects <b>ppt</b>		
15	Monday, 11/25	Student Projects <b>ppt</b>		<b>Research Paper due</b>
	Wednesday, 11/27	<b>Thanksgiving Break</b>		
	Friday, 11/29	<b>Thanksgiving Break</b>		
16	Monday, 12/2	Student Projects <b>ppt</b>		

## **ABET Student Outcomes**

### **CAC Student Outcomes:**

This course may support the following CAC student outcomes:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions (CAC 1).
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline (CAC 2).
- Communicate effectively in a variety of professional contexts (CAC 3).
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline (CAC 5).
- Apply computer science theory and software development fundamentals to produce computing-based solutions (CAC 6).

### **EAC Student Outcomes:**

This course may support the following EAC student outcomes:

- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives (EAC 5).
- An ability to acquire and apply new knowledge as needed, using appropriate teaming strategies (EAC 7).

**Computer Issues and IT Support:** Speed IT staff are available by appointment from 9 am to 4 pm to assist you with your technology needs. You may schedule an appointment by sending a detailed email including any relevant error codes and screen snips at [SPDHelp@Louisville.edu](mailto:SPDHelp@Louisville.edu) (preferred) or 502-852- 7620.

## **Incomplete (I) Grades**

As described in the Academic Catalog, students may request an incomplete under the following conditions:

- More than 50% of the semester's course work, as computed by percent of final grade excluding the final exam has been completed;
- Performance on the completed course work is considered passing;
- The inability to complete the final portion of the course work is due to reasons beyond the student's control, such as, but not limited to: prolonged illness, death in the immediate family, catastrophic events such as a car wreck, and travel restrictions.

Before a grade of incomplete is assigned, the student must provide documentation of the extenuating circumstances. Exams taken as part of removing the incomplete can be different from the exams given during the semester. If the student does not meet the deadlines for completing all work, a grade of F will be assigned, and no additional extensions will be given.

### **Title IX/Clery Act Notification**

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain **confidential** support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).

**Disclosure to University faculty or instructors** of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is **not confidential** under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.

For more information, see <http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>.