

Applied Artificial Intelligence (CPSC 254)

Catalog Course Description

Concepts of Artificial Intelligence (AI), application software, and open-source projects. Understanding AI capabilities, AI applications, their impact, and ethical issues. Identifying domain-specific problems and solving them with modern computing technologies and related open-source projects or tools.

Student Learning Goals

Upon completion of this course, students will be able to:

- Understand and explain the concepts of Artificial Intelligence (AI), application software, open-source projects or tools, AI capabilities and their applications, their societal impact, and ethical issues;
- Identify domain-specific problems suitable for AI applications;
- Develop applications to solve domain-specific problems using modern computing technologies and available open-source projects or tools;
- Effectively present their creations to a general audience.

Credits: 3 units

Prerequisite: GE Area A.3 (Critical Thinking) or B.4 (Quantitative Reasoning)

Instructor: Christopher Ryu, Ph.D.

Office: CS-421

Phone: (657) 278-7231

Email: tryu@fullerton.edu

Office Hours: Mon. and Wed. 4:00 pm – 5:30 pm or via ZOOM appointment

Textbook, lecture notes, and course materials

- No textbook is required.
- Lecture notes and supplemental materials will be posted.

Administrative drops

Any student who misses the first two consecutive class meetings may be dropped from this class unless he/she contacts the instructor or the Computer Science department within 24 hours.

Drop policy

A new university withdrawal policy went into effect beginning the spring 1997 semester (UPS 300.016). The policy "stipulates that authorization to withdraw after the second week and prior to the last three weeks of instruction shall be granted for only the most serious reasons. A serious reason is defined as a physical, medical, emotional, or other condition that has the effect of limiting the student's full participation in the class.... The reason must be documented by the student...." The new University Policy also states specifically that "poor academic performance is NOT evidence of a serious reason for withdrawal."

Communication

You have a CSUF-supplied email account, and that is the only way I have of reaching you outside class. Check your email and course page daily for important class announcements and individual messages. I try to respond to emails within two working days, but occasionally may take longer than that. Plan accordingly, especially around deadlines.

Attendance and class participation

You are expected to attend all lectures and actively participate in discussion and activities. Regular attendance is essential for success in this class, and you are responsible for any materials covered during missed lectures.

Students who complete **at least one of the pop quizzes or class activities administered without prior announcement** will receive **50%** of the full credit. Additional completion will increase the credit proportionally, up to full credits for participation and attendance. There will be **no make-up** pop quizzes or class activities.

Assignments

There will be multiple assignments. Detailed information about assignments/projects will be announced later. The grade is based strictly on the quality of the work that shows understanding and applicability of the materials, not based on the "hard work component."

Third-party work (code, artwork, etc.) may not be used in student work without prior instructor consent. Failure to gain and document instructor consent will be construed as willful academic dishonesty. When a third party's work is incorporated into student work after gaining instructor consent, failure to wholly document the work's origin, copyright and license will be construed as willful academic dishonesty.

Exams

There will be multiple short quizzes to measure individual performance on major topics discussed. There may be some **pop quizzes** for bonus points. Exam questions may include all types, such as T/F, multiple choice, short answer, etc. **All exams will be closed books and notes.**

Makeup policy: If you are absent from the exam and have a *valid and documented excuse* (e.g., Doctor's note), such as an illness, a death in your family, or another equally compelling reason, the weight of your final will be increased by the weight of the exam/quiz. Without a valid excuse, you will receive a zero score for the exam/quiz, and the final weight will remain unchanged.

Final exam

No final exam

Bonus work or pop quizzes may be given only when necessary. However, after the last day of the class, **no extra work** will be given to raise your scores.

Check all your scores before the semester is over.

*For every assignment and project you have turned in and exam you have taken, the record will be posted on the class page. *You are responsible for checking your record.* If you find any discrepancy on your record, you need to let me know about it as soon as possible (at least **BEFORE the final grade is given**). I strongly recommend that you *keep all your records of your work with the timestamp* until you receive your final grade.

Grading Policy

Your grade will be determined by several of your activities, as shown below.

<i>Class activities</i>	<i>Weights in Percentage</i>
Class participation and attendance	9%
Assignments	43%
Quizzes	48%
Total	100%

* The final grade is computed by weighted sum, $\sum w_i x_i$, where w_i is the weight shown in the above table and x_i is your score on the basis of the 100 percentile. Letter grades will be assigned using the plus/minus scheme as follows (\geq indicates the range minimum):

A: $\geq 92\%$ A-: $\geq 90\%$
 B+: $\geq 87\%$ B: $\geq 82\%$ B-: $\geq 80\%$
 C+: $\geq 77\%$ C: $\geq 72\%$ C-: $\geq 70\%$
 D+: $\geq 67\%$ D: $\geq 62\%$ D-: $\geq 60\%$

*Grades may be assigned by your performance relative to the class average, especially when the class average is low (e.g., < 80). However, no one will be penalized if the class as a whole does excellent work. If given, the weight of bonus work or quiz may be determined by me, considering the class average **within 5%** of the overall score.

Academic Dishonesty

Academic dishonesty, such as plagiarism or cheating, will result in a **grade of F** in this course. Repeat offenses may have more severe consequences, up to and including expulsion from the University.

The following is taken from the University Rules (UPS 300,021):

"*Academic dishonesty* includes such things as cheating, inventing false information or citations, plagiarism, and helping someone else commit an act of academic dishonesty. It usually involves an attempt by a student to show possession of a level of knowledge or skill which he/she in fact, does not possess."

"*Cheating* is defined as the act of obtaining or attempting to obtain credit for work by the use of any dishonest, deceptive, fraudulent, or unauthorized means. Examples of cheating include, but are not limited to, the following: using notes or aids or the help of other students on tests and examinations in ways other than those expressly permitted by the instructor, plagiarism as defined below, tampering with the grading procedures, and collaborating with others on any

assignment where such collaboration is expressly forbidden by an instructor. Violation of this prohibition of collaboration shall be deemed an offense for the person or persons collaborating on the work, in addition to the person submitting the work."

"*Plagiarism* is defined as the act of taking work of another and offering it as one's own without giving credit to that source. When sources are used in a paper, acknowledgment of the original author or source must be made through appropriate references and, if directly quoted, quotation marks or indentations must be used."

Student information for course syllabus

<https://fdc.fullerton.edu/teaching/student-info-syllabi.html>

Technical Support

In case of technical problems with the learning management system, please contact the help desk at (657) 278-8888.

Disabled Student Services

The University requires students with disabilities to register with the Office of Disabled Student Services (DSS) within the first week of classes. The office of Disability Support Services' website is <http://www.fullerton.edu/DSS/>. They can be reached by phone at (657) 278-3117 or TDD at 657-278-2786. Their email address is dsservices@fullerton.edu. Their office is located in University Hall, room 101. Students requesting accommodations should inform the instructor during the first week of classes about any disability or special needs that may require specific arrangements/accommodations related to attending class sessions, completing course assignments, writing papers or quizzes/tests/examinations."

Emergency Policy (earthquakes, fire, etc.)

For your own safety and the safety of others, each student is expected to read and understand the guidelines published at «<http://prepare.fullerton.edu/campuspreparedness/>». Should an emergency occur, follow the instructions given to you by faculty, staff, and public safety officials. An emergency information recording is available by calling the Campus Operation and Emergency Closure line at 657-278-4444.

Tentative Lecture Schedule

A tentative schedule ("**subject to change**") for this class is shown below:

<i>Weeks</i>	<i>Topics</i>
Artificial Intelligence (AI)	
1–2	An overview of artificial intelligence AI capabilities and real-world applications The impacts of AI on society: social and ethical issues
High-Performance Computing	
2–4	Computing fundamentals, coding tools and environment, and open-source projects Basic Python programming High-performance computing for AI applications
Machine Learning and Deep Learning	
5–8	An overview of machine learning and deep learning Artificial Neural Networks: Perceptron, MLP, Convolutional Neural Networks (CNNs) Computer vision: Image classification, object detection and recognition, face recognition, digit and character recognition from images
Natural Language Processing (NLP) and Large Language Models (LLMs)	
9–11	An overview of NLP Text processing, text classification, and sentiment analysis Natural language understanding Customizing LLMs: Pretraining, Finetuning, RAG Conversational agents, speech recognition, and voice generation
Generative AI and Agentic AI	
12–15	Creativity and generative AI: Language generation, story generation, image generation, and image translation, and text-to-image synthesis (optional) Music generation Agentic AI: Autonomous intelligent agents