Course Prefix and Number: CAP5625
Introduction to Artificial Intelligence
CRN 52896, Section #700, 3 Credit Hours
COURSE SYLLABUS

Semester: Summer 2023
Dates: 05/15/2023- 07/21/2023
Delivery method: Online, Off-campus
Location: Online / Off-campus
Instructor: Mauricio Pamplona Segundo
Virtual Office Hours: Technology used (Microsoft Teams)

Minimum Technical Skills & Requirements:
In order to take courses online at USF, you will need to be able to demonstrate proficiency at basic computer skills, maintain reliable internet access, and meet the computer system requirements listed at: https://www.usf.edu/it/remote/requirements-for-students

Synchronous Sessions: Meeting Times and Technology
In this class, Microsoft Teams will be used to host virtual office hours.

I. **University Course Description**
Basic concepts, tools, and techniques used to produce and study intelligent behavior. Organizing knowledge, exploiting constraints, searching spaces, understanding natural languages, and problem-solving strategies.

II. **Course Prerequisites**
COP 4530: Data Structures

III. **Course Purpose**
This core course aims to provide a general background on materials and methods in the field of Artificial Intelligence (AI) so that the students can later specialize in different subfields through elective courses. It will cover classical methods from different branches of AI (search, reasoning, and learning) and the main software libraries in use nowadays.

IV. **First Day Attendance Policy**
Students must answer a first day quiz. Students who do not complete the first day's activity run the risk of being dropped from the course.

V. **Student Learning Outcomes**

By the end of the course, students will:

- Identify the basics of artificial intelligence (AI) and machine learning (ML)
- Demonstrate classical methods used in AI/ML
- Implement selected algorithms for different AI projects
- Evaluate their AI solution through experiments
- choose the appropriate AI/ML methods for different applications
- Identify ethical issues related to the development and application of AI/ML
- Develop their problem-solving, logical reasoning, and creativity skills

VI. **Required Texts and/or Readings and Course Materials**

- Artificial Intelligence: A Modern Approach, Fourth Edition, by Stuart Russell and Peter Norvig, 2021. ISBN 978-0134610993. Website: http://aima.cs.berkeley.edu/
- Jupyter notebooks (https://jupyter.org/), Google Colaboratory (https://colab.research.google.com/)
- Numpy (https://numpy.org/), scikit-learn (https://scikit-learn.org/), keras (https://keras.io/)

VII. **Supplementary (Optional) Texts and Materials**

- Deep Learning, Fourth Edition, by Ian Goodfellow, Yoshua Bengio and Aaron Courville, 2016. ISBN 978-0262035613. Website: https://www.deeplearningbook.org/

VIII. **Grading Scale**

Grading Scale (%)

90 - 100	A
80 - 89	B
70 - 79	C
60 - 69	D
0 - 59	F

IX. **Grade Categories and Weights**

Graded Items	**Percent of Final Grade**
Projects	40%
Quizzes	10%
Final Exam	30%
Midterm	20%
Course Improvement Survey	3% (extra credit)

X. **Instructor Feedback Policy & Grade Dissemination**

The instructor will respond to email communication relevant to the subject matter within 48 hours of the date received. The instructor will provide feedback on projects within two

weeks of the posted deadline. You can access your scores at any time using "Grades" in Canvas.

XI. **Course Schedule**

Week	**Topics**	**Book chapters**	**Graded Assignments**
1	Introduction to AI Intelligent agents	1,2	
1	Uninformed search algorithms: Depth-First Search, Breadth-First Search, Iterative Deepening, Uniform-Cost Search	3	
2	Constraint satisfaction problems Informed search algorithms: Greedy Best-First Search, A*	3,6	
2	Local search: Hill-Climbing, Local Beam Search, Genetic Algorithms	4	
3	Adversarial search and games Minimax algorithm	5	Project 1 due
4	Monte Carlo approach Probability & NumPy	5, 12	
4	Bayesian inference Particle filter	12, 13, 14	
5			Midterm Project 2 due
6	Introduction to machine learning, K-Means, K-Nearest Neighbors Principal Component Analysis, scikit-learn	19	
6	Linear Discriminant Analysis Support Vector Machines		
7	Introduction to Deep Learning Linear regression, Backpropagation	21	
8	Multilayer perceptron Keras	21	Project 3 due
9	Convolutional Neural Networks, Autoencoders Natural language processing, Recurrent neural networks	21	
9	Attention-based networks Reinforcement learning	21, 22	
10			Final exam Project 4 due

* Note: The Schedule is subject to revision

XII. **USF Core Syllabus Policies**

USF has a set of central policies related to student recording class sessions, academic integrity and grievances, student accessibility services, academic disruption, religious observances, academic continuity, food insecurity, and sexual harassment that **apply to all courses at USF**. These may be accessed on the USF Core Syllabus Policy Statements page at https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx.

XIII. **Course Policies: Grades**

Late Work Policy

There are no make-ups for quizzes, the midterm, or the final exam. Projects turned in late will be assessed with a penalty of 20% per extra day (number of days is rounded up).

Grades of "Incomplete"

The current university policy concerning incomplete grades will be followed in this course.

Extra credit

This course has an optional improvement survey. Students can earn 3% extra credit added to the overall grade for this course by completing this survey.

XIV. **Course Policies: Technology and Media**

Canvas

Students are expected to check Canvas for announcements, materials, and assignments every day.

Online Proctoring

All students must review the syllabus and the requirements, including the online terms and video testing requirements, to determine if they wish to remain in the course. Enrollment in the course is an agreement to abide by and accept all terms. Any student may elect to drop or withdraw from this course before the end of the drop/add period. Online exams and quizzes within this course may require online proctoring. Therefore, students will be required to have a webcam (USB or internal) with a microphone when taking an exam or quiz. Students understand that this remote recording device is purchased and controlled by the student and that recordings from any private residence must be done with the permission of any person residing in the residence. To avoid any concerns in this regard, students should select private spaces for the testing. The University library and other academic sites at the University offer secure private settings for recordings and students with concerns may discuss location of an appropriate space for the recordings with their instructor or advisor. Students must ensure that any recordings do not invade any third-party privacy rights and accept all responsibility and liability for violations of any third-party privacy concerns. Students are strictly responsible for ensuring that they take all exams using a reliable computer and high-speed internet connection. Setup information will be provided prior to taking the proctored exam. To use Honorlock students are

required to download and install the Honorlock Google Chrome extension*. For additional information please visit the* USF online proctoring student FAQ *and* Honorlock student resources*."*

XV. Course Policies: Student Expectations

Title IX Policy

Title IX provides federal protections for discrimination based on sex, which includes discrimination based on pregnancy, sexual harassment, and interpersonal violence. In an effort to provide support and equal access, **USF has designated all faculty (TA, Adjunct, etc.) as Responsible Employees, who are required to report any disclosures of sexual harassment, sexual violence, relationship violence or stalking.** The Title IX Office makes every effort, when safe to do so, to reach out and provide resources and accommodations, and to discuss possible options for resolution. Anyone wishing to make a Title IX report or seeking accommodations may do so online, in person, via phone, or email to the Title IX Office. For information about Title IX or for a full list of resources please visit: https://www.usf.edu/title-ix/gethelp/resources.aspx. *If you are unsure what to do, please contact Victim Advocacy – a confidential resource that can review all your options – at 813-974-5756 or va@admin.usf.edu.*

Course Hero / Chegg Policy

The USF Policy on Academic Integrity specifies that students may not use websites that enable cheating, such as by uploading or downloading material for this purpose. This does apply specifically to Chegg.com and CourseHero.com – any use of these websites (including uploading proprietary materials) constitutes a violation of the academic integrity policy.

Turnitin.com

In this course, turnitin.com will be utilized. Turnitin is an automated system which instructors may use to quickly and easily compare each student's assignment with billions of websites, as well as an enormous database of student papers that grows with each submission. Accordingly, you will be expected to submit all assignments via Canvas. After the assignment is processed, as instructor, I receive a report from turnitin.com that states if and how another author's work was used in the assignment. For a more detailed look at this process visit http://www.turnitin.com.

End of Semester Student Evaluations

All classes at USF make use of an online system for students to provide feedback to the University regarding the course. These surveys will be made available at the end of the semester, and the University will notify you by email when the response window opens. Your participation is highly encouraged and valued.

Netiquette Guidelines

1. Act professionally in the way you communicate. Treat your instructors and peers with respect, the same way you would do in a face-to-face environment. Respect other people's ideas and be constructive when explaining your views about points you may not agree with.
2. Be sensitive. Be respectful and sensitive when sharing your ideas and opinions. There will be people in your class with different linguistic backgrounds, political and religious beliefs or other general differences.
3. Proofread and check spelling. Doing this before sending an email or posting a thread on a discussion board will allow you to make sure your message is clear and thoughtful. Avoid the use of all capital letters, it can be perceived as if you are shouting, and it is more difficult to read.
4. Keep your communications focused and stay on topic. Complete your ideas before changing the subject. By keeping the message on focus you allow the readers to easily get your idea or answers they are looking for.
5. Be clear with your message. Avoid using humor or sarcasm. Since people can't see your expressions or hear your tone of voice, meaning can be misinterpreted.

Email and Discussion Board Guidelines

1. Use the subject line effectively by using a meaningful line of what your email or discussion is about.
2. Keep your emails and postings related to the course content. You should not post anything personal on a discussion board, unless is requested by the instructor.
3. Any personal, course or confidential issues should be directly communicated to the instructor via email. The discussion boards are public spaces; therefore, any issues should not be posted there.