

**University of Florida**  
**College of Public Health & Health Professions Syllabus**  
**PHC 3793 Higher Thinking for Healthy Humans:**  
**AI in Healthcare and Public Health**  
 (3 credit hours)  
 Semester: Fall 2024  
 Tuesdays 1:55 – 3:50 PM  
 Location: HPNP G114  
 Delivery Format: On-Campus (In-person) & Blended Learning

**Instructor Name:** Aprinda Indahlastari Queen, PhD

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**Phone Number:** (352) 294-8990

**Office Hour:** After class (in-person), or by appointment on Zoom

**Zoom Address:** <https://ufl.zoom.us/my/aprindaindahlastari>

**Canvas URL:** <http://elearning.ufl.edu/>;

**Preferred Course Communications:** Messages via Canvas, UFL email

**Prerequisites:** STA2023 or equivalent; or permission from instructor

## PURPOSE AND OUTCOME

**Course Overview.** This course covers a broad overview and introductory level of history, foundational concepts, and basic methods on artificial intelligence (AI), focusing on public health and healthcare applications, including hands-on practice on graphical/high-level AI software. The course neither provides or necessitates prior programming knowledge nor advanced statistical/machine learning training.

**Program Outcomes.** This course contextualizes historical and methodological topics of AI into public health, healthcare, and relevant research applications. The course enriches our educational program covering 'next-generation data science', in compliance to up-to-date accreditation standards, and with translational relevance to public health, healthcare, and professional practice.

**AI Credit.** Know and Understand AI (Know-AI): Know the basic functions of AI and to use AI applications in the context of public health and healthcare. AI course content is over 50%.

**Student Learning Outcomes Related to AI Categories (AI-SLOs).** 1) Identify, describe, and/or explain the various characteristics of AI, such as differentiation of supervised, unsupervised, and reinforcement learning. 2) Recognize, identify, describe, define, and explain applications of AI in the domain of public health and healthcare, such as in medical research and healthcare administration.

**Course Objectives and/or Goals.** This course has the objective to provide the students with conceptual understanding of fundamental AI methods, including practical examples in public health and healthcare, and to get them acquainted with high-level AI software for data analysis and visualization. Upon successful completion of the course, students will be able to:

- Explain the history of AI and conceptual theory of basic machine learning algorithms;
- Give examples of basic AI methodologies and discuss where they are best utilized in Public Health and Healthcare;
- Evaluate the performance of AI models and validate their appropriateness;
- Describe the health implications/issues related to AI modelling and presence of bias, addressing the concepts of causal AI;
- Summarize typical use cases and applications of AI in Public Health and healthcare;
- Utilize high-level graphical AI software to execute a machine learning pipeline on provided dataset without the need of prior programming knowledge.

Knowledge-based goals according to Bloom's taxonomy of educational objectives:

1. *Knowledge.* Recognition of machine learning / AI techniques, e.g. "What is an artificial neural network?"

2. *Comprehension*. Ability to understand the intended use of AI methods, e.g. “Can an artificial neural network be used to predict whether a tumor is benign or malignant?”
3. *Application*. Ability to use AI methods in a specific context, e.g. “Can we apply an AI method to identify a possible causal structure from the given data?”
4. *Analysis*. Ability to draw conclusions using data and AI models, e.g. “Can we visualize the socio-demographic clusters found by the AI algorithm on the data, and evaluate if they are associated to different health outcomes?”
5. *Evaluation*. Ability to use the AI modelling for translational purposes, e.g. “After simulating several public health intervention scenarios with the deep learning model, we conclude that the best strategy according to the resource constraints is...”
6. *Synthesis*. Ability to decide if the AI pipeline is adequate for a problem of interest, e.g. “For this prediction problem, we conclude that a linear regression is a better choice than a deep learner because it has similar performance, but it is more interpretable.”

**Instructional Methods.** The course will be divided into in-person class sessions (once per week) and supplemented with online lectures and content through a blended learning approach. The online content delivery will be through the course’s Canvas site. Course materials and assignment may include homework and critical reading of scientific papers. Teaching materials/links will be posted online. All course slides will be made available online for download. The online material (including this syllabus) will be processed through SensusAccess to make sure it is compliant to Federal, State and University’s accessibility policies and governance.

## DESCRIPTION OF COURSE CONTENT

### Topical Outline/Course Schedule

The first half of the semester is dedicated to AI theory and fundamental concepts, the remaining half will cover practical applications of AI in public health and healthcare with guest lectures from experts in the field.

Class schedule:

Week	Date	AI-Related Topic	# Hours of AI-related Content	AI-Related Assignment (on weekly topic)
1	Aug-27	Introduction, AI history, and healthcare data	3	HW 1 out
2	Sept-3	Machine learning introduction; SVM	3	HW1 due (9/2); HW2 out
3	Sept-10	Ethics in AI (Dr. Hammarlund)	3	HW2 due (9/9); HW3 out; Install Weka
4	Sept-17	k-Nearest Neighbor; Weka Demo	3	HW3 due (9/16); HW4 out
<b>5</b>	<b>Sept-24</b>	<b>EXAM 1</b>	3	HW4 due (9/23)
6	Oct-1	Tree-based methods; Weka Demo	3	HW 5 out
7	Oct-8	Clustering; Weka Demo	3	HW5 due (10/7); HW6 out
8	Oct-15	Neural networks & deep learning	3	HW6 due (10/14); HW7 out
<b>9</b>	<b>Oct-22</b>	<b>EXAM 2</b>	3	HW7 due (10/21)
10	Oct-29	Federated Learning (Dr. Xu)	3	
11	Nov-5	Weka Review and Project Discussion	3	Pipeline Project Proposal Due (11/8)
12	Nov-12	AI for Rehabilitation and Assistive Technology (Dr. Wang)	3	

13	Nov-19	AI applications in Cognitive health and ADRD (Dr. Gullett)	3	Pipeline Assignment Due (11/22)
14	Nov-26	<i>Thanksgiving Break - No Class</i>		
15	Dec-3	Natural language processing (Dr. Zhang)	3	
16	Finals week	<i>No Class</i>		Research Paper Due (12/10)

## COURSE MATERIAL AND TECHNOLOGY

**Course slides.** Provided by the course instructor and posted online.

**Textbook(s):** None mandatory. Recommended (optional) freely available online textbooks/resources: “Introduction to Statistical Learning” (<https://www.statlearning.com/>) and “Deep Learning” (<https://www.deeplearningbook.org/>).

**Reading materials.** Provided by the course instructor and posted online.

**Hardware:** Webcam and Microphone may be required for out-of-class activities. We may use laptop built in webcams and students may be required to move camera during use. Additional technical requirements are outlined at <https://it.phphp.ufl.edu/phphp-computer-requirements/>

**e-Learning in Canvas site:** There will be an online site for this course in Canvas, the learning management system supported by the University. Log in at <https://lss.at.ufl.edu/> and go to course site for PHC3793: Fall 2022. The syllabus, out-of-class course content, assignments, and other course materials will be posted here. The course site will also allow for discussions/chats among the students and course leaders. You will also turn in assignments through this site. It will be your responsibility to check the site on a routine basis to keep up with announcements, emails, and content modifications.

**Software.** Weka (<https://www.cs.waikato.ac.nz/ml/weka/>).

For technical support for this class, please contact the UF Help Desk at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

## ACADEMIC REQUIREMENTS AND GRADING

### Weekly Homework (30 points, 6 X 5 points each, 30% of Total Grade)

Each week during Week 1 through 8, a case or problem set will be assigned (7 total assignments, dropping the lowest score for a total of 6 at 5% each, equal to 30% of total grade). Assignments will include but not limited to multiple choice, matching, short answers, and interpreting results. The topics of the assignments for that week will reflect the lecture topics covered in the same week (e.g., Homework 2 will cover AI history and healthcare data). Homework write-ups and related files will be turned in electronically via the Canvas e-learning system.

**Pipeline Assignment (10 points, 10% percent of Total Grade) – Due November 8<sup>th</sup> and November 22<sup>nd</sup>**

Implement and execute properly a machine learning pipeline in Weka. Student will perform correct machine learning pipeline and visualization with already formatted dataset. The submission of this assignment will contain a fully generated model, data output, and a brief report as attachment in Canvas. This assignment counts for 10% of the total grade and does not require prior programming knowledge. Students are encouraged to consult one another on problems and programming issues, but **everyone should perform their own programming and write-ups, and turn in their own work; no copying is permitted.**

1. Pipeline Project Proposal (4% of total grade) due November 8<sup>th</sup>: 1-page summary to include project title, aims/objectives, selected machine learning algorithm, and the planned dataset.
2. Pipeline Complete Assignment (6% of total grade) due November 22<sup>nd</sup>: A completed pipeline assignment including execution in Weka and a written report.

### **Research Paper (10 points, 10% percent of Total Grade) – Due December 10<sup>th</sup>**

Submit a research paper based on guest lectures in AI Applications for Week 10-15. For each of these lectures, student will provide the following:

1. Lecture Summary: Concisely summarize the key points and main themes covered in the guest lecture.
2. Concept Connections: Relate specific concepts discussed in the guest lecture to those learned in the preceding weeks (Weeks 1 to 9).
3. Term Research: Investigate at least one unfamiliar terminology introduced during the guest lecture and provide explanations.
4. Insight and Reflection: Share personal insights and reflections on how the guest lecture enhances the overall learning experience.
5. Conclusion: Sum up reported research findings and present the main takeaways from these lectures.

### **Exam 1 (20 points, 20% of Total Grade) – September 24<sup>th</sup>**

Students will take a 20-question in-class exam. The exam will take place during the normally scheduled class time. You will need to bring a laptop or other device to access the exam via Canvas, no sharing permitted. Questions will address the content in the online materials (asynchronous) as well as class lectures and discussions (synchronous) and will be in the form of multiple choice, fill-in-the-blank, matching, and short answer (technical/methodological questions and applied/discussion questions). The exam will cover all content included in Weeks 1 through 4. The exam will require the lockdown browser provided via Canvas.

### **Exam 2 (20 points, 20% of Total Grade) – October 22<sup>nd</sup>**

Students will take a 20-question in-class exam. The exam will take place during the normally scheduled class time. You will need to bring a laptop or other device to access the exam via Canvas, no sharing permitted. Questions will address the content in the online materials (asynchronous) as well as class lectures and discussions (synchronous) and will be in the form of multiple choice, fill-in-the-blank, matching, and short answer (technical/methodological questions and applied/discussion questions). The exam will cover all content included in Weeks 6 through 8. The exam will require the lockdown browser provided via Canvas.

### **In-class Participation (10 points, 10% of Total Grade)**

In addition to live lectures, we will be incorporating in-class active learning approaches by using interactive and discussion-based activities. Students are expected to be engaged during class and participate in pair or small group class discussions/activities. Example activities will include problem solving/analysis, peer-peer interaction, paper reading/synthesis, small group activities, case studies, and similar. In the event that students are not able to attend live classes, they should contact instructors for make-up participation.

### **Extra Credit (no more than 5%)**

Extra Credit opportunities will be available throughout the semester at the discretion of the instructor.

### **Grading**

Requirement	Due date	Points or % of total grade (% must sum to 100%)

Weekly Homework	Mondays at 11:59PM	30 Points (6 x 5-points each) 30% of Total Grade
Exam 1	September 24, in-class	20 Points, 20% of Total Grade
Exam 2	October 22, in-class	20 Points, 20% of Total Grade
Pipeline Assignment	November 8, 11:59PM November 22, 11:59PM	10 Points, 10% of Total Grade
Research Paper	December 10, 11:59PM	10 Points, 10% of Total Grade
Class Participation	Synchronous (live lectures)	10 Points, 10% of Total Grade

*\*All listed times are in EST*

Point system used (i.e., how do course points translate into letter grades).

<b>Points earned</b>	93.0-100	90.0-92.9	87.0-89.9	83.0-86.9	80.0-82.9	77.0-79.9	70.0-76.9	67.0-69.9	63.0-66.9	60.0-62.9	Below 60
<b>Letter Grade</b>	A	A-	B+	B	B-	C+	C	D+	D	D-	E

<b>Letter Grade</b>	<b>A</b>	<b>A-</b>	<b>B+</b>	<b>B</b>	<b>B-</b>	<b>C+</b>	<b>C</b>	<b>C-</b>	<b>D+</b>	<b>D</b>	<b>D-</b>	<b>E</b>	<b>WF</b>	<b>I</b>	<b>NG</b>	<b>S-U</b>
<b>Grade Points</b>	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0	0.0	0.0	0.0	0.0

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at: <http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

## COURSE POLICIES

### Late Assignments

Each late assignment will receive a penalty of 25% deduction per day from the total correct score.

**Special Circumstances.** In the event of exceptional situations that may interfere with your ability to perform an assignment or meet a deadline, contact the instructor as soon in advance of the deadline as possible. Such cases will be dealt on an individual, case-by-case basis.

Absences should be discussed with the instructor in advance when possible. Late arrivals to class start-time and early departures before class ends are discouraged, as they have the potential to disrupt the class. However, extenuating circumstances occur and sometimes these things are necessary. If necessary, please make such instances as minimally disruptive as possible out of courtesy to the rest of the class.

Please note: Any requests for make-ups due to technical issues should be accompanied by the ticket number received from UF Computing Help Desk ([helpdesk@ufl.edu](mailto:helpdesk@ufl.edu)) when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail the instructor, as applicable, within 24 hours of the technical difficulty if you wish to request a make-up.

### Policy Related to Make up Work

Make-up work will be determined on a case-by-case basis. Please send an email to the instructor.

Please note: Any requests for make-ups due to technical issues should be accompanied by the UF Computing help desk (<http://helpdesk.ufl.edu/>) correspondence. You MUST e-mail the instructor within 24 hours of the technical difficulty if you wish to request a make-up.

### Policy Related to Required Class Attendance

All faculty are bound by the UF policy for excused absences. For information regarding the UF Attendance Policy see the Registrar website for additional details: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Attendance at all scheduled course activities is expected. Additionally, students will be responsible for additional out-of-class activities as part of a partially blended classroom environment (described above). Further, the assignments outlined will be completed outside of class. Students will be required to meet with their term project groups outside of class and may find it beneficial to attend other events or have additional scheduled meetings, depending on the topic selected by their working group outside of the in-person course meetings.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/>

### **Policy Related to Guests Attending Class**

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee (e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all courses. No further extensions will be granted. Please note that guests are **not** permitted to attend either cadaver or wet labs. Students are responsible for course material regardless of attendance. For additional information, please review the Classroom Guests of Students policy in its entirety. Please consult UF guideline: <https://catalog.ufl.edu/UGRD/academic-regulations/>

## **STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT**

### **Communication Guidelines**

The communication guidelines are a collaborative agreement between the all of the students and the instructor (and TA, as applicable). Email messages are expected to be sent through UF email or the Canvas system. Students should expect a response within 2 business day (48 hours).

*Announcements:* Class announcements will be sent via the announcements tool in eLearning. Depending on your CANVAS notification settings, you may or may not be notified via email; you are responsible for all information in these announcements whether or not you see them in your email.

Further, please see the university's Netiquette Guidelines:

<https://biostat.ufl.edu/current-students/e-learning-resources/e-learning-basics/etiquette-online/>

### **Academic Integrity**

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

**“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”**

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

**“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code for additional details:

<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

### Online Faculty Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

If 80% of students submit the online faculty evaluation, 1 additional point will be applied to the final grade of all students. If 100% of students submit the online faculty evaluation, 2 additional points will be applied to all student's final grade.

### The Use of Generative AI Tools (including ChatGPT)

Unless specifically requested or authorized by your course instructor for a particular need, the use of generative AI tools such as ChatGPT or BARD on assignments, essays/reflection papers, exams, and quizzes **is considered cheating** and you would be violating the UF Regulations 4.040 [Student Honor Code](#) and [Student Conduct Code](#). When authorized, the use of electronic and other resources, including artificial intelligence tools, requires proper attribution.

The following actions are prohibited in this course:

- Submitting all or any part of an assignment statement to an online learning support platform
- Incorporating any part of an AI generated response in an assignment
- Using AI to summarize or contextualize source materials
- Submitting your own work for this class to AI platforms for iteration or improvement

If you are in doubt as to whether you are using an AI tool appropriately in this course, I encourage you to discuss your situation with your class instructor. Any assignment content composed by any resource other than you, regardless of whether that resource is human or digital or machine, must be attributed to the source through proper citation.

You are responsible for understanding your dynamic data stewardship responsibilities to minimize personal, college, and university risk.

[UF Integrated Risk Management – CHATGPT Privacy, Factual Accuracy and Usage Guidelines](#)

### Recording Within the Course

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal

or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

## **SUPPORT SERVICES**

### **Accommodations for Students with Disabilities**

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester. The College is committed to providing reasonable accommodations to assist students in their coursework.

### **Counseling and Student Health**

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. Online and in person assistance is available.
- You Matter We Care website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- Crisis intervention is always available 24/7 from:  
Alachua County Crisis Center:  
(352) 264-6789  
<http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>



Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

### **Inclusive Learning Environment**

Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious, and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: [www.multicultural.ufl.edu](http://www.multicultural.ufl.edu)