



**IUPUI**

SCHOOL OF INFORMATICS AND COMPUTING  
Department of Human-Centered Computing

## **AII 30000 / INFO-I 340** **Collaborative Human–AI Systems**

BS/BA in Artificial Intelligence Program

*Section No.:* *Credit Hours:* 3  
*Time:* TBD  
*Location:* TBD, Informatics & Communications Technology Complex  
535 West Michigan Street, Indianapolis, IN 46202 [\[map\]](#)  
*First Class:* Fall 2022  
*Website:*  
*Instructor:* Khairi Reda, Ph.D., Assistant Professor, Data Science and HCI  
*Office Hours:* TBD, or by Appointment  
*Office:* IT 581, Informatics & Communications Technology Complex  
535 West Michigan Street, Indianapolis, IN 46202 [\[map\]](#)  
*Phone:* 317-274-5788 (Office)  
*Email:* [redak@iupui.edu](mailto:redak@iupui.edu)  
*Website:* <https://khreda.com/>

*Prerequisites:* AII 20000

### **COURSE DESCRIPTION**

This course introduces human–AI interaction design for systems that solve problems neither humans nor AI could solve alone. Topics include interpretability, transparency, and trust. Student projects focus on applications, such as those in data science, where AI provides cognitive and perceptual augmentation to humans.

### **REPRESENTATIVE RESOURCES**

Bigham, J., Bernstein, M., & Adar, E. (2015). Human–computer interaction and collective Intelligence. In T. W. Malone & M. S. Bernstein (Eds.), *Handbook of Collective Intelligence*. Cambridge, Mass.: MIT Press. <https://mitpress.mit.edu/books/handbook-collective-intelligence>

Possible readings are listed here: <http://www.humanaiaclass.org/schedule/>

## STUDENT LEARNING OUTCOMES

Upon completion of this course, students will	RBT	<a href="#">PLUS</a>	PLO	Assessment
1. Design and develop symbiotic human-AI systems that balance the information processing power of computational systems with human intelligence and decision making.	6	P3.2	1	Proposal Presentation Report
2. Apply human-centered methods to characterize AI requirements in different domains and application areas.	3	P2.3	1	Class Presentation Homework
3. Evaluate the advantages, disadvantages, challenges, and ramifications of human-AI augmentation.	5	P2.1 P2.3	1	Class Presentation Homework
4. Assess the benefits and limitations of AI in relation to human intelligence.	5	P2.1 P2.3	1	Class Presentation Homework
5. Analyze the impact of a human-AI system on the individual, organization, and society from the standpoint of fairness and bias, ethical principles, and legal implications.	4	P4.3 P4.4	1	Proposal Presentation Report

\*[RBT: Revised Bloom's Taxonomy](#): 1. Remembering, 2. Understanding, 3. Applying, 4. Analyzing, 5. Evaluating, 6. Creating

## PROFILES OF LEARNING FOR UNDERGRADUATE SUCCESS (PLUS):

P2.1 **Problem Solver** – Think critically

P2.3 **Problem Solver** – Analyzes, synthesizes, and evaluates

P3.2 **Innovator** – Creates/designs

P4.3 **Community Contributor** – Behaves ethically

P4.4 **Community Contributor** – Anticipates consequences

## PROGRAM LEARNING OUTCOME COMPETENCY AREA

1. Human-AI Interaction

## TEACHING AND LEARNING METHODS

Team-based learning; project-based learning; design futures methodology

## TOPICS

1. Introduction to Human-AI Interaction
2. Perspectives on Human-AI Interaction
3. Designing AI/ML User Experience
4. Designing for failure

5. Data & Knowledge. Where does it come from? Who owns it?
6. Data Visualization & Data Communication
7. Interpreting and Explaining Algorithms
8. AI Ethics
9. Fairness, Social Acceptability, and Trust in AI
10. Human in the loop with AI/ML & Recommendations
11. Natural Language & Speech Applications
12. Vision, Images, & Art
13. Special Topic/Application Area

### **Learning Assessments**

1. Homework 1	10%
2. Homework 2	20%
3. Class presentation and discussion	25%
4. Final Project Proposal (Team)	5%
5. Final Project Presentation and Demo (Team)	10%
6. Final Report and Source Files (Team)	30%

### **EXPECTATIONS, GUIDELINES, AND POLICIES**

#### **Attendance:**

A basic requirement of this course is that you will participate in all class meetings, whether online or face-to-face, and conscientiously complete all required course activities and assignments. Class attendance is required for classroom-based courses. It entails being present and attentive for the entire class period. Attendance shall be taken in every class. If you do not sign the attendance sheet while in class, you shall be marked absent. Signing the attendance sheet for another student is prohibited. The instructor is required to submit to the Registrar a record of student attendance, and action shall be taken if the record conveys a trend of absenteeism.

If you are ill during a pandemic, you must not come to class in person. Contact the instructor immediately by Canvas messages to make other arrangements. The instructor may let you attend class remotely by teleconferencing or give you a make-up assignment. Other acceptable excuses for absences include death in the immediate family (e.g., mother, father, child, spouse, domestic partner, or sibling), hospitalization or serious illness; jury duty; court ordered summons; religious holiday; university/school coordinated athletic or scholastic activities; or an unanticipated event that would cause attendance to result in substantial hardship to yourself or immediate family. Absences should be communicated to the instructor, who will decide whether missed work may be made up. Absences that do not satisfy the above criteria are considered unexcused. Documentation from a healthcare provider during the pandemic is not required. At other times, documentation should exclude the nature of the physical or mental health condition and focus instead on how the condition impacts your attendance and academic performance. You are allowed two excused or unexcused absences. For all absences, the student is responsible for all covered materials and assignments.

Unexcused Absences: Missing class reduces your grade through the following grade reduction policy: Each unexcused absence after the two allowed results in a 5% reduction in your final course grade. Unexcused absences in 50% of classes in the first quarter of the class will result in an administrative withdrawal. More than six unexcused absences result in an F in the course.

### **Incomplete:**

The instructor may assign an [incomplete](#) (I) grade only if at least 75% of the required coursework has been completed at passing quality and holding you to previously established time limits would result in unjust hardship to you. All unfinished work must be completed by the date set by the instructor. Left unchanged, an incomplete automatically becomes an F after one year.

### **Deliverables:**

You are responsible for completing each deliverable (e.g., assignment, quiz) by its deadline and submitting it by the specified method. Deadlines are outlined in the syllabus or in supplementary documents accessible through Canvas. Should you miss a class, you are still responsible for completing the deliverable and for finding out what was covered in class, including any new or modified deliverable. In fairness to the instructor and students who completed their work on time, a grade on a late deliverable that resulted from an unexcused absence shall be reduced 10%, if it is submitted late and a further 10% for each 24-hour period it is submitted after the deadline.

### **Grading Scale:**

A+	97–100%	Professional level work, showing highest level of achievement
A	93–96.99%	Extraordinarily high achievement, quality of work; shows command of the subject matter
A–	90–92.99%	Excellent and thorough knowledge of the subject matter
B+	87–89.99%	Above average understanding of material and quality of work
B	83–86.99%	Mastery and fulfillment of all course requirements; good, acceptable work
B–	80–82.99%	Satisfactory quality of work
C+	77–79.99%	Modestly acceptable performance and quality of work
C	73–76.99%	Minimally acceptable performance and quality of work
C–	70–72.99%	Unacceptable work (Core course must be repeated for credit)
D+	67–69.99%	Unacceptable work (Course must be repeated for credit)
D	63–66.99%	Unacceptable work
D–	60–62.99%	Unacceptable work
F	Below 60	Unacceptable work

No credits are granted for a grade below C.

### **CODE OF CONDUCT**

All students should aspire to the highest standards of academic integrity. Using another student's work on an assignment, cheating on a test, not quoting or citing references correctly, or any other form of dishonesty or plagiarism shall result in a grade of zero on the

item and possibly an F in the course. Incidences of academic misconduct shall be referred to the Department Chair and repeated violations shall result in dismissal from the program. All students are responsible for reading, understanding, and applying the *Code of Student Rights, Responsibilities and Conduct* and in particular the section on academic misconduct. Refer to *The Code > Responsibilities > Academic Misconduct*. <https://studentcode.iu.edu/> All students must also successfully complete the Indiana University Department of Education “How to Recognize Plagiarism” Tutorial and Test. You must document the difference between your writing and that of others. Use quotation marks in addition to a citation, page number, and reference whenever writing someone else’s words (e.g., following the *Publication Manual of the American Psychological Association*). To detect plagiarism instructors apply a range of methods, including Turnitin.com.

### **Academic Misconduct:**

1. **Cheating:** Cheating is an attempt to use or provide unauthorized assistance, materials, information, or study aids in any form and in any academic exercise or environment.
  - a. A student must not use external assistance on any “in-class” or “take-home” examination, unless the instructor specifically has authorized external assistance. This prohibition includes, but is not limited to, the use of tutors, books, notes, calculators, computers, and wireless communication devices.
  - b. A student must not use another person as a substitute in the taking of an examination or quiz, nor allow other persons to conduct research or to prepare work, without advanced authorization from the instructor to whom the work is being submitted.
  - c. A student must not use materials from a commercial term paper company, files of papers prepared by other persons, or submit documents found on the Internet.
  - d. A student must not collaborate with other persons on a particular project and submit a copy of a written report that is represented explicitly or implicitly as the student’s individual work.
  - e. A student must not use any unauthorized assistance in a laboratory, at a computer terminal, or on fieldwork.
  - f. A student must not steal examinations or other course materials, including but not limited to, physical copies and photographic or electronic images.
  - g. A student must not submit substantial portions of the same academic work for credit or honors more than once without permission of the instructor or program to whom the work is being submitted.
  - h. A student must not, without authorization, alter a grade or score in any way, nor alter answers on a returned exam or assignment for credit.
2. **Fabrication:** A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citation to the sources of information.
3. **Plagiarism:** Plagiarism is defined as presenting someone else’s work, including the work of other students, as one’s own. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged.
  - a. A student must not adopt or reproduce ideas, opinions, theories, formulas, graphics, or pictures of another person without acknowledgment.

- b. A student must give credit to the originality of others and acknowledge indebtedness whenever:
  1. directly quoting another person's actual words, whether oral or written;
  2. using another person's ideas, opinions, or theories;
  3. paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
  4. borrowing facts, statistics, or illustrative material; or
  5. offering materials assembled or collected by others in the form of projects or collections without acknowledgment
4. **Interference:** A student must not steal, change, destroy, or impede another student's work, nor should the student unjustly attempt, through a bribe, a promise of favors or threats, to affect any student's grade or the evaluation of academic performance. Impeding another student's work includes, but is not limited to, the theft, defacement, or mutilation of resources to deprive others of the information they contain.
5. **Violation of Course Rules:** A student must not violate course rules established by a department, the course syllabus, verbal or written instructions, or the course materials that are rationally related to the content of the course or to the enhancement of the learning process in the course.
6. **Facilitating Academic Dishonesty:** A student must not intentionally or knowingly help or attempt to help another student to commit an act of academic misconduct, nor allow another student to use his or her work or resources to commit an act of misconduct.

## CAMPUS POLICIES

1. **Administrative withdrawal (undergraduate only):** Students must participate in all class discussions and conscientiously complete all required course activities and/or assignments. If a student is unable to attend, participate in, or complete an assignment on time, the student must inform the instructor. If a student misses more than half of the required activities within the first 25% of the course without contacting the instructor, the student may be administratively withdrawn from this course. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal occurs after the full refund period, and a student who has been administratively withdrawn is ineligible for a tuition refund. <https://studentcentral.iupui.edu/register/administrative-withdrawal.html>
2. **Counseling and Psychological Services (CAPS):** Students seeking counseling or other psychological services should contact the [CAPS office](#) at 274-2548 or [capsindy@iupui.edu](mailto:capsindy@iupui.edu).
3. **Course policies:** Several campus policies governing IUPUI courses may be found at the following [link: http://registrar.iupui.edu/course\\_policies.html](http://registrar.iupui.edu/course_policies.html)
4. **Disabilities policy:** All qualified students enrolled in this course are entitled to reasonable accommodations for a disability. Notify the instructor during the first week of class of accommodations needed. Students requiring accommodations register with Adaptive Educational Services (AES) and complete the appropriate forms from AES before receiving accommodations. The AES office is located at UC 100, Taylor Hall (Email: [aes@iupui.edu](mailto:aes@iupui.edu), Tel. 317 274-3241). For more information visit

- <http://aes.iupui.edu>. For ADA resources visit <https://accessibility.iu.edu/ada/>. For ADA policies visit <https://policies.iu.edu/policies/ua-02-americans-disability-act/>.
5. **Education and Title VI:** IUPUI nurtures and promotes “a campus climate that seeks, values, and cultivates diversity in all of its forms and that provides conditions necessary for all campus community members to feel welcomed, supported, included, and valued” (IUPUI Strategic Initiative 9). IUPUI prohibits “discrimination against anyone for reasons of race, color, religion, national origin, sex, sexual orientation, marital status, age, disability, or veteran status” (Office of Equal Opportunity). Title VI of the Civil Rights Act of 1964 protects people from discrimination based on race, color, or national origin in programs or activities that receive Federal financial assistance. Programs and activities that receive ED funds must operate in a nondiscriminatory manner, including admissions, recruitment, financial aid, academic programs, student treatment and services, counseling and guidance, discipline, classroom assignment, grading, vocational education, recreation, physical education, athletics, housing, and employment, if it affects those who are intended to benefit from the Federal funds. <http://www2.ed.gov/about/offices/list/ocr/docs/hq43e4.html>
  6. **Emergency preparedness:** Know what to do in an emergency to be protected and to protect others. For more information, visit the emergency management website at <http://protect.iu.edu/emergency>.
  7. **No class attendance without enrollment:** Only those who are officially enrolled in this course may attend class unless enrolled as an auditor or making up an incomplete by prior arrangement with the instructor. This policy does not apply to those assisting a student with a documented disability, serving in an instructional role, or administrative personnel. <https://facultystaffcentral.iupui.edu/enrollment/index.html> Children may *not* attend class with their parents, guardians, or childcare providers.
  8. **Religious holidays:** IUPUI respects the right of all students to observe their religious holidays and will make reasonable accommodation, upon request, for such observances. Students seeking accommodation for religious observances must submit a [request form](#) to the course instructor by the end of the second week of the semester. For information visit.
  9. **Sexual misconduct:** One of the instructor’s responsibilities is to create a safe learning environment. IU does not tolerate sexual harassment or violence, which are prohibited under Title IX and the [sexual misconduct policy](#). The university can help students subjected to sexual misconduct. To seek help, obtain information and resources, or speak to someone confidentially, visit <https://stopsexualviolence.iu.edu/>. Federal regulations and University policy require the instructor to convey promptly any information about potential sexual misconduct to IUPUI’s Deputy Title IX Coordinator or IU’s Title IX Coordinator to ensure appropriate measures are taken and resources are offered. To protect a student’s privacy all involved will only share information with those who need to know to ensure the university can respond and assist.
  10. **Student advocate:** The Student Advocate assists students with personal, financial, and academic issues. The Student Advocate is in the Campus Center, Suite 350, and may also be contacted at 317 274-4431 or [studvoc@iupui.edu](mailto:studvoc@iupui.edu). For more information visit <http://studentaffairs.iupui.edu/advocate>.

## SCHOOL POLICIES AND GUIDELINES

1. **Civility:** To maintain an effective and inclusive learning environment, it is important to be an attentive and respectful participant in lectures, discussions, groupwork, and other classroom exercises. Thus, unnecessary disruptions should be avoided, such as ringing cell phones, engagement in private conversations, and other unrelated activities. Cell phones, media players, or any noisy devices should be turned off during a class. Texting, web surfing, and posting to social media are generally not permitted. Laptop use may be permitted if it is used for taking notes or conducting class activities. Students should check with the instructor about permissible devices in class. Profanity or derogatory comments about the instructor, fellow students, invited speakers or other classroom visitors, or any members of the campus community shall not be tolerated. A violation of this rule shall result in a warning and, if the offense continues, possible disciplinary action.
2. **Communication:** For classroom-based courses, the instructor or teaching assistant should respond to emails by the end of the next class or, for online courses, within two Indiana University working days, which excludes weekends and holidays. The instructor should provide weekly office hours or accept appointments for face-to-face, telephone, or teleconferenced meetings, and announce periods of extended absence in advance.
3. **Course evaluations:** Course evaluations provide vital information for improving the quality of courses and programs. Students are urged to complete one course and instructor evaluation for each section in which they are enrolled at the School of Informatics and Computing with the following exceptions: (a) The student has withdrawn from the course; (b) fewer than five students are enrolled in the section (in which case maintaining anonymity is difficult); and (c) the section is a laboratory that must be taken with a course having a different section number. Course evaluations are completed at <https://soic.iupui.edu/app/course-eval/>. Course evaluations are typically open from the eleventh week. Course evaluations are anonymous, which means that no one can view the name of the student completing the evaluation. In addition, no one can view the evaluation itself until after the instructor has submitted the final grades. In small sections, demographic information should be left blank, if it could be used to identify the student.
4. **Email:** Indiana University uses the student's IU email account as an official means of communication, and students should check it daily. Although the student may have IU email forwarded to an outside email account, the student should email faculty and staff from the student's IU email account.
5. **Right to revise:** The instructor reserves the right to make changes to this syllabus as necessary and, in such an event, will notify students of the changes immediately.

## MISSION STATEMENT

The Mission of IUPUI is to provide for its constituent's excellence in

- Teaching and Learning;
- Research, Scholarship, and Creative Activity; and
- Civic Engagement.

With each of these core activities characterized by

- Collaboration within and across disciplines and with the community;
- A commitment to ensuring diversity; and

- Pursuit of best practices.

IUPUI's mission is derived from and aligned with the principal components—Communities of Learning, Responsibilities of Excellence, Accountability and Best Practices—of Indiana University's Strategic Directions Charter.

### **STATEMENT OF VALUES**

IUPUI values the commitment of students to learning; of faculty to the highest standards of teaching, scholarship, and service; and of staff to the highest standards of service. IUPUI recognizes students as partners in learning. IUPUI values the opportunities afforded by its location in Indiana's capital city and is committed to serving the needs of its community. Thus, IUPUI students, faculty, and staff are involved in the community, both to provide educational programs and patient care and to apply learning to community needs through service. As a leader in fostering collaborative relationships, IUPUI values collegiality, cooperation, creativity, innovation, and entrepreneurship as well as honesty, integrity, and support for open inquiry and dissemination of findings. IUPUI is committed to the personal and professional development of its students, faculty, and staff and to continuous improvement of its programs and services.