

# CS 5047 Exploring AI Trends and Tools Syllabus

## COURSE AND INSTRUCTOR INFORMATION

### Course Information

Course title and number: CS 5047

Course name: Exploring AI Trends and Tools

Semester: Fall 2024

Semester Hours: 4

Prerequisites: None

### Instructor Information

## PROGRAM LEARNING OUTCOMES (core courses only)

1. Identify AI tools that can improve business or operational practices through applying a human-centered approach.
2. Identify potential risks and benefits of using AI.
3. Plan on AI-related issues and identify potential solutions.
4. Exhibit awareness of known biases in AI systems and propose steps for mitigation and correction.
5. Communicate technical and non-technical information effectively to diverse stakeholders.
6. Collaborate with cross-functional teams to apply AI in specific contexts and domains.

## COURSE LEARNING OUTCOMES

1. Categorize new AI advancements with regard to key concepts in AI and recognize their societal impact.
2. Recognize ethical considerations and biases in AI systems and propose potential mitigations.
3. Apply AI to a specific problem or dataset and interpret the results within the specified domain.

4. Simplify complex AI concepts to communicate effectively with both technical and non-technical stakeholders.

## COURSE DESCRIPTION

Explore key ideas in Artificial Intelligence (AI) while delving into trending developments in the field. Examines AI tools and frameworks to enable collaboration effectively and efficiently across technical and non-technical stakeholders. Analyze topics such as AI-enabled perception, representation, reasoning, and learning as contextualized by societal impact. Equips students with the knowledge and skills necessary to confidently navigate the ever-evolving landscape of artificial intelligence.

## ASSIGNMENTS, ASSESSMENTS & TIME ALLOCATION

### Course Assessments

#### Classroom participation 10%

There will be ten discussion questions in total (2% for each discussion), and we plan to use the Canvas Discussion Board to facilitate interaction.

#### Homework assignments 30%

For Weeks 5-9, students will conduct every week a class assignment (4% for each assignment). Each assignment involves practicing the skills taught.

#### Quizzes 20%

For all other weeks (Weeks 2-4 and 10-13), students will conduct every week a quiz (2.5% for each quiz). Each quiz covers the concepts taught.

#### Mid-term 20%

After Week 7, all students will take a take-home mid-term focused on AI foundations and cases where AI is applied to. Key for this mid-term is to evaluate if students are able to apply the knowledge and skills they have learned to practical situations.

#### Final Exam/Project 20%

There will be one final project, which will be of your choice. The final project submission consists of a comprehensive documentation of the project work done in the second part of the course (after the

mid-term). The breakdown of the final project is: 5% for the research/design/development project topic and a project plan; 5% for a write-up of project motivation; 5% for the execution of the research plan; 5% for the final presentation and documentation.

## GRADING

### Standards:

A	94+
A-	90 to 93
B+	87 to 89
B	84 to 86
B-	80 to 83
C+	76 to 79
C	72-75
C-	68 to 71
F	less than 68

**Rounding Policy:** Grades are rounded up to the nearest whole number.

## COURSE MATERIALS

This course will rely on excerpts of the following two books:

Taulli, T. (2019). *Artificial intelligence basics: A non-technical introduction*. Berkeley, CA: Apress.

Castrounis, A. (2019). *AI for people and business: A framework for better human experiences and business success*. O'Reilly Media.

For the practical parts of the course, it will rely on the following book:

James, G., Witten, D., Hastie, T., Tibshirani, R., & Taylor, J. (2023). *An introduction to statistical learning: With applications in Python*. Springer Nature.

## EVALUATION & ACADEMIC INTEGRITY

**Student Expectations**

To be determined by instructor

**Class Participation**

This is a participatory course and each student is expected to be an active participant in the work that occurs. Student learning in this course is directly related to the efforts made in learning the course material. Attending class and arriving to class promptly is expected of each student (and shows respect for fellow students). Students will be called on in class, and each student can expect to be called on unexpectedly several times during the semester.

**Professional Conduct**

Part of the student learning experience is to practice professional behavior. This includes affording your student peers, presenters and professors the courtesy of not using computers, cell phone, pagers or text messaging during class. Non-adherence to these expectations of professional behavior will result in dismissal from class. Consistent with University policy, students must seek the course instructor's permission to record class lectures.

**Make Up Policy**

To be determined by instructor

**Late Work Policy**

To be determined by instructor

**Syllabus Disclaimer**

Any changes to the syllabus will be made at the discretion of the instructor. It is the responsibility of the student to stay informed of any such changes.

**Academic Integrity**

The highest level of ethical behavior is expected of all students. Plagiarism, cheating, and any form of unauthorized collaboration will not be tolerated and will be handled in accordance with University policies including the Academic Honesty and Integrity Policy. Requirements can be found at:

<http://www.northeastern.edu/osccr/academic-integrity-policy/>

- Acts of academic dishonesty will be referred to OSCCR (Office of Student Conduct and Conflict Resolution).
- Infractions will be dealt with according to Northeastern Disciplinary Process shown in <http://www.northeastern.edu/osccr/academic-integrity-report-form/>
- The Turnitin application may be used by the course instructor to identify and document cases of plagiarism.

**ACADEMIC SUPPORT**

## **Diversity, Equity, and Inclusion**

We acknowledge that chronic and persistent disparities in education due to systemic oppression, based on race, class, and other marginalized identities, have adversely affected individuals and society.

Within the college, we strive to create a safe environment for diverse thoughts, perspectives, and experiences to be shared, explored, and embraced. As a community we recognize that disrupting long-standing oppressive practices is a process. Everyone is at a different place on this journey, and we affirm our commitment to support and learn from one another.

## **Students with Disabilities**

The Disability Resource Center (DRC), located on campus in 20 Dodge Hall (617-373-2675) can provide students with information and other assistance to help manage any challenges that may affect their performance in the coursework. The University requires that students provide documentation of their disability to the DRC. Students should meet with the course instructor for special accommodations to be arranged.

Northeastern University abides by Section 504 of the Rehabilitation Act of 1973, which stipulates that no student shall be denied the benefits of an education "solely by reason of a handicap." Disabilities covered by law include but are not limited to, learning disabilities and hearing, sight, or mobility impairments. Additional information about DRC can be found online at <http://www.northeastern.edu/drc/>

## **Student Wellness**

As a student, you may experience a range of challenges including significant stress, difficult life events, mood changes, excessive worry, or problems with eating and/or sleeping. These can diminish your academic performance and/or reduce your ability to participate in daily activities. If you or anyone you know is struggling, we strongly encourage you to seek support. Northeastern University provides several services and resources to support the overall wellness of students:

[University Health and Counseling Services](#)

[Find at Northeastern](#)

[We Care](#)

As always, please contact [Northeastern University Police Department](#) at 617-373-3333 in emergency situations.

## **Title IX Policy:**

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including students, faculty and staff of all gender identities.

Learn more at: (<https://www.northeastern.edu/ouec/training-and-education/syllabus-language-title-ix/>)

**Course Feedback:**

The Office of the Registrar, in collaboration with the Office of the Provost, administers the TRACE (Teacher Rating and Course Evaluation) for undergraduate and graduate courses at Northeastern University. Students' assessments through TRACE are completely anonymous. Given the public nature of student comments made through TRACE and their intended use to enhance teaching, students are asked to please be thoughtful, professional and considerate with response.

## COURSE CALENDAR

**Week/Dates      Topic**

<b>Week 1</b>	Introduction to AI
<b>Week 2</b>	AI Tools and Frameworks
<b>Week 3</b>	AI Tools and Frameworks
<b>Week 4</b>	Application of AI to Problems and Datasets
<b>Week 5</b>	Application of AI to Problems and Datasets
<b>Week 6</b>	Interpreting Results
<b>Week 7</b>	Interpreting Results

<b>Week 8</b>	Impact of AI on Society
<b>Week 9</b>	Societal Implications and Responsibilities
<b>Week 10</b>	Ethical Considerations in AI
<b>Week 11</b>	Mitigating Bias
<b>Week 12</b>	Communicating AI Concepts to Non-Technical and Technical Stakeholders
<b>Week 13</b>	Future Trends in AI
<b>Week 14</b>	Real-world Problem Project and Final Discussions
<b>Week 15</b>	Real-world Problem Project and Final Discussions