CSIS-501: INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Effective Term
Fall 2026

BOT Approval Date
05/15/2025

Discipline
CSIS - Computer Sci/Info Systems
Course Number
501

Course Title
Introduction to Artificial Intelligence and Data Science

Short Title
Intro to AI and Data Science

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
3.00

Total Units
3.00

Hours

Lecture Contact Hours
48-54
Out of Class Hours Lecture
96-108

Total Contact Hours
48 - 54

Total Out of Class Hours
96 - 108

Total Student Learning Hours
144 - 162

Distance Education
Yes

Distance Education

Distance Education Type
Both Fully Online and Hybrid Online

Fully Online Delivery Requirements:
a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course

b. Any planned face-to-face meetings, such as an orientation or study session, must be optional
c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?

No

Regular Substantive Interaction

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods: • Orientation - Students must be oriented to the online and face-to-face portions at the start of the course. • Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc. • Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction. • MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students. • Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS. • Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Catalog Description

This course introduces students to the basics of artificial intelligence (AI), including concepts and terms like computer vision, natural language processing, machine learning, deep learning, and neural networks. This course will also explore the basic concepts of data science and how it is used with artificial intelligence. AI issues will be explored, including ethics, bias, culture, and regulations.

Codes

TOP Code (CB 03)

0702.00* - *Computer Information Systems

CIP Code

11.0102 - Artificial Intelligence.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Minimum Qualifications

Minimum Qualifications	And/Or
Computer Information Systems	End

Learning Objectives

Learning Objectives

Learning Objective
1. Investigate the different emerging trends in technology.
2. Scrutinize the potential impact of AI on society.
3. Examine the foundations of Data Science.
4. Identify the three common domains of AI related to data, computer vision, and natural language processing
5. Evaluate machine learning principles, including supervised and unsupervised learning.
6. Examine the applications of data science on neural networks and deep learning architecture.

7. Investigate the steps in a data science workflow.
8. Evaluate the societal and ethical implications surrounding artificial intelligence.
9.Analyze how AI systems can reinforce or mitigate biases in data and algorithms, including race and gender.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will describe the emerging trends in artificial intelligence and their potential impact on society.
2. Students will develop an understanding of the foundations of Data Science and Data Science workflow.
3. Students will evaluate supervised and unsupervised learning fundamentals and their role in neural networks.

Content

Course Lecture Content

1. Historical context, racial and gender bias in AI
1. Artificial Intelligence key concepts
   a. The definition of AI, machine learning, and deep learning
   b. Historical developments that differentiate modern AI from prior AI
   c. Machine learning and deep learning examples
   d. Supervised learning and unsupervised learning differences
   e. Applications of artificial intelligence
2. Artificial intelligence in the industry
   a. Healthcare and genomics
   b. Transportation and automated driving
   c. Retail and supply chain
   d. Finance
   e. Industrial
   f. Government
3. Artificial Intelligence in the enterprise and data science workflow
   a. The steps in a data science workflow
   b. Key roles and needed skillsets in artificial intelligence
   c. Structure of an artificial intelligence team
   d. Common data science misconceptions
   e. Maintenance components of an artificial intelligence model
4. Supervised Learning
   a. Formulation of supervised learning problems
   b. Training and inference
   c. Overfitting versus testing data
   d. Python programming in artificial intelligence
5. Data Sources and Types
   a. The need for data samples
   b. Data wrangling and augmentation
   c. Overfitting and underfitting
   d. Popular data sets for neural networks
   e. Data processing methods
   f. Labeling data
   g. Challenges in working with data
6. Principles of deep learning
   a. Deep learning with artificial intelligence and machine learning
   b. Types of problems deep learning solves
   c. Steps in building a neural network
   d. Convolutional neural networks

   e. Transfer learning
   f. Common deep learning architectures
7. Hardware
   a. End-to-end computing for artificial intelligence
   b. Data centers, gateways, and edge computing
   c. Processor types
8. Building Blocks
   a. Deep learning frameworks
   b. Optimized libraries
   c. Big data
   d. BigDL library
   e. AI DevCloud
9. Bias and DEI Artificial Intelligence
   a. Historical context, racial and gender bias in AI
   b. Inclusive data collection
   c. Racial bias in facial recognition
   d. Gender bias in language models
   e. Socioeconomic Bias in Hiring Algorithms
   f. Bias in predictive policing
   g. Healthcare Algorithm Bias
   h. Cultural Bias in Content Moderation
   i. Age Bias in AI Health Diagnostics

Methods of Instruction

Method

Lecture

Integration

Lectures will be presented with supporting visual materials (digital slide presentation or multimedia). They will introduce conceptual and practical skills such as emerging technologies, the impact of artificial intelligence on society, common domains, the importance of neural networks, and societal and ethical implications surrounding artificial intelligence.

DE Adaptations for MOI

Lectures will be delivered using video capture software to embed voice into digital slides. Larger videos will be broken down into shorter, digestible segments. All videos will be closed-captioned with synchronized audio. Any resources or documents will comply with accessibility standards. Transcripts of the lectures will be provided upon request.
All lectures will be delivered using the course management system.

Method

Observation and Demonstration

Integration

Observation and demonstration will allow students to gain practical experience by writing code and implementing artificial intelligence algorithms that focus on supervised and unsupervised learning, applications of Data Science, and training neural networks.

DE Adaptations for MOI

Observation and demonstration will utilize interactive platforms (e.g., Jupyter Notebooks, Google Colab) that provide an online interactive coding environment. In addition, weekly code-along sessions will be presented via closed-captioned video with synchronized text, where students follow the instructor's lead in writing code. Any external link provided will have descriptive text explaining the link's destination. All resources or documents will comply with accessibility standards.
The course management system will present all interactive demonstrations and video-guided practice materials.

Method

Discussion

Integration

Weekly discussions will be conducted to deepen students' understanding of AI theories and ethical considerations. Topics will include emerging trends in technology, foundations of Data Science, analysis of how AI systems can reinforce or mitigate biases in data and algorithms, applications of Data Science on neural networks, data science workflow, and ethical and societal implications.

DE Adaptations for MOI

The discussion tool in the course management system will be used to conduct weekly discussions organized into structured threads. This will make it easier for students to follow and contribute relevant conversations. Any external link within the discussion thread will have descriptive text explaining the link's destination. Images included in any discussion topic will have alternate text that provides a detailed image description. Any resources or documents will comply with accessibility standards.

Methods of Evaluation

Method

Quizzes

Integration

Bi-monthly quizzes composed of short answer questions will cover topics such as assessing common artificial intelligence domains, supervised and unsupervised learning, neural networks, deep learning, and neural network training.

DE Adaptations for MOE

Quizzes in the course will be submitted via the quizzes editor of the course management system. If videos are included, they will be closed captioned with synchronized text. Any images embedded in the quizzes will have alternate text that conveys the information given in the image. Any external link within the quiz will have descriptive text explaining the link's destination. Any resources or documents provided will comply with accessibility standards. Feedback will be provided to the students via the course management system.

Method

Exams/Tests

Integration

A midterm and final exam with short answer questions and small programming examples will be given. The exams will be designed to evaluate the mastery of such topics as computer vision, natural language processing, supervised and unsupervised learning, deep learning, and neural networks.

DE Adaptations for MOE

Exams will be submitted via the course management system's assignment editor. All exams will have alternate text provided for images that give a detailed image description. Any external link within the assignment will have descriptive text explaining the link's destination. If videos are provided, they will be closed captioned with synchronized text. Any resources or documents will comply with accessibility standards. Feedback will be provided to the students via the course management system.

Method

Homework

Integration

Weekly programming assignments that apply important concepts and skills to the student’s experience outside the classroom will be given. The focus of homework assignments will be on such topics as the impact of artificial intelligence on society, analysis of how AI systems can reinforce or mitigate biases in data and algorithms, computer vision, natural language processing, machine learning principles, and training neural networks.

DE Adaptations for MOE

Assignments will be administered and collected using the course management system's assignment tool. They will be created using accessible file formats such as HTML, accessible PDF, and text documents. Any links used within an assignment will have

descriptive text explaining the link's destination. Any included videos will be closed captioned with synchronized text. Any resources or documents will comply with accessibility standards

Feedback will be provided to students via the comments section within the assignments tool of the course management system.

Assignments

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Explore one of the two data sets provided, then choose a suitable supervised learning algorithm for the chosen data set. Split the data set into training and testing sets and train the supervised learning algorithm. Evaluate the model's performance on the testing data using appropriate metrics (e.g., mean squared error regression).
Documentation:

How assignment will be adapted in online format

This assignment will be distributed and collected through the assignments area of the course management system. Feedback on the assignment will be given in the comments section of the grade book for the assignment, which is part of the course management system.

Any external link within the assignment will have descriptive text explaining the link's destination. Any resources or documents will comply with accessibility standards.

Assignment Type

Reading

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Read Discriminating Systems: Gender, Race, and Power in AI from the AI Now report. Create a written analysis of how AI systems can perpetuate racial and gender discrimination, particularly in hiring, law enforcement, and social services.

How assignment will be adapted in online format

This assignment will be distributed and collected through the assignments area of the course management system. Feedback on the assignment will be given in the comments section of the grade book for the assignment, which is part of the course management system.

Any external link within the assignment will have descriptive text explaining the link's destination. Any resources or documents will comply with accessibility standards.

Assignment Type

Writing

In-class and/or outside of class
In-class

Formative or Summative
Summative

Assignment
Select a publicly available dataset. Inspect the dataset for any missing values, inconsistencies, or errors. Perform the following tasks:

1. Handle Missing Data: Identify missing values and decide how to handle them (e.g., removing rows/columns, imputing missing values).

2. Data Transformation: Normalize or standardize any numerical data if necessary. Format categorical variables appropriately.

3. Feature Selection: If the dataset has many features, select a subset of features for analysis based on relevance.

How assignment will be adapted in online format
This assignment will be distributed and collected through the assignments area of the course management system. Feedback on the assignment will be given in the comments section of the grade book for the assignment, which is part of the course management system.

Any external link within the assignment will have descriptive text explaining the link's destination. Any resources or documents will comply with accessibility standards.

Course Materials

Textbooks
Understanding Artificial Intelligence {AI} Volume One: A Comprehensive Beginners Guide to the World of Artificial Intelligence [Books of Understanding™ - Computer/Tech]
Publication date : September 25, 2025
ISBN : 979-8339450955

Class Size Information

Class Size
35

Class Size Category
B - Facilitated learning 35

Diversity and Inclusion

Course Design and Materials: Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

Inclusive Learning Environment: Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

Accessible Instruction: Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

Equitable Teaching Practices: Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

Culturally Responsive Pedagogies: Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

Ongoing Reflection and Improvement: Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

Inclusion will be incorporated in the course in several ways. The first will be to address the issue of racial and gender bias in artificial intelligence. This will be accomplished by exploring real-world examples of artificial intelligence algorithms exhibiting bias. Strategies for mitigating racial and gender bias in artificial intelligence will be discussed.
Multiple teaching modalities, such as visual aids, audio resources, and hands-on activities that cater to different learning styles, will be incorporated into the lectures and written material for the class.
Students will be encouraged to share their experiences related to artificial intelligence concepts in an inclusive discussion environment so that students will feel comfortable expressing themselves and engaging in conversation.
The course lecture material will be infused with diversity. It will reflect diverse voices and perspectives on the field of artificial intelligence. The works of researchers, practitioners, and innovators from various backgrounds and cultures will be highlighted. In addition, the material presented in the course will incorporate case studies involving marginalized communities. Examples will include facial recognition biases, predictive policing, and healthcare disparities.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

Assignments will be framed around real-world artificial intelligence applications relevant to social justice and diverse industries, such as healthcare and finance. This will allow students to see the practical applications of artificial intelligence in various domains.
The methods of instruction will incorporate multimodal teaching approaches that cater to different learning styles. A combination of lectures, visual aids, hands-on activities, and interactive discussions will be used to discuss such topics as supervised learning, data sources, deep learning, DEI and bias.

Evaluation criteria that emphasize the essential skills and knowledge for success will be communicated. Constructive and actionable feedback will support ongoing improvement, focusing on improvement rather than mistakes.
The course content will offer a variety of learning resources, including articles, videos, and examples from diverse sources, covering topics such as data sources, data types, deep learning, hardware, and the building block of AI. This will expose students to differing perspectives in the field of artificial intelligence.

Interactions

Explain how the course will incorporate student-to-student interaction.

The course will include facilitated live and virtual weekly discussions so students can discuss, share insights, and ask questions about artificial intelligence concepts such as supervised learning, deep learning, data sources, and data types. Questions will be posed, and case studies will be offered to stimulate discussion on supervised learning, deep learning, DEI, and Bias. Within the observation and demonstration aspect of the class, students will be encouraged to share their ideas and thoughts to solve data wrangling, inclusive data collection, and supervised learning problems. Observation and demonstration will be provided both live and virtual through the use of recorded video and online discussions.

Students will be assigned group projects, where they can collaborate on building AI models, implementing algorithms, and solving real-world problems using AI techniques.

Peer code reviews will allow students to exchange code and provide feedback on each other's AI projects or assignments. This will promote collaboration, help students learn different coding styles and problem-solving techniques, and reinforce key AI concepts.

Explain how the course will incorporate instructor-to-student interaction.

Instructor-to-student interaction will be incorporated through live or recorded lectures, including question-and-answer sessions where student questions on hardware, AI in industry, data science, supervised learning, and deep learning can be answered and clarified.

Time will be provided, during which students can meet with the instructor in one-on-one or small groups to discuss, seek clarification, or receive additional help and feedback on assignments covering such topics as supervised learning, deep learning, data sources, and bias in AI. Time for one-on-one interactions will be provided both face-to-face and virtually. Emails to the instructor will be promptly replied to. Personalized feedback on assignments will be provided.

Explain how the course will incorporate student-to-content interaction.

Both live and recorded lectures will be given, emphasizing interaction. They will incorporate small coding problems, quizzes, and open-ended discussions on topics such as deep learning, data sources, supervised learning, and ethical considerations in AI development. At the end of major milestones in the course, self-assessment quizzes will be given, allowing the students to gauge

their progress. Self-assessment quizzes will also be placed within the reading material so students can test their understanding of the material presented.

Explain how the course will incorporate student-to-self interaction (metacognitive).

The lecture will include exercises on deep learning, supervised learning, data sources, and data science that prompt students to think about how they learn best. Students will be encouraged to reflect on their study habits, identify effective learning strategies, and suggest potential adjustments.
Assignments that involve AI programming or analysis of topics such as supervised learning, neural networks, and deep learning will include metacognitive reflection prompts at the end. An example is "How confident are you in your solution and why?"

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