

Course Last Updated [03/26/2024]



## Artificial Intelligence in Society

### Section I: Course Overview

**Course Code:** CS305

**Subject Area(s):** Computer Science

**Prerequisites:** None

**Language of Instruction:** English

**Total Contact Hours:** 45

**Credits:** 3

**Course Fees:** None

### Course Description

This course provides an intensive exploration of Artificial Intelligence (AI) and explains its various applications to society. Students will analyse the impact of AI on different industry sectors of society, including education, healthcare, transport, financial services, and insurance. This course will engage in not only the practical applications of AI in creative problem-solving, and content generation, but also the ethical considerations surrounding the use of AI in society.

Students will delve into the mechanics of machine learning, natural language processing, computer vision and deep learning models such as GPT-4, Perplexity, to gain insights into their capabilities in generating text, images, video, and sound. By the end of this course, students will be able to apply foundational AI concepts to generate creative solutions, design innovative AI-driven experiences, and critically analyse the ethical and practical implications of artificial intelligence in society.

### Learning Objectives

Upon successful completion of this course, students are able to:

- Articulate developments in artificial intelligence (AI) and its various applications in society.
- Identify the impact of AI on different sectors of society, including healthcare, education, and financial services.

- Investigate the ethical considerations surrounding the use of AI in society.
- Examine the benefits and challenges of AI implementation.
- Outline the basic concepts and processes involved in machine learning algorithms.
- Identify common natural language processing techniques and tools.
- Analyse the benefits and challenges of using large Language models in real-world situations.
- Create visual data using AI.
- Examine the connection between robotics and AI.

## Section II: Instructor & Course Details

### Instructor Details

**Name:** TBC

**Contact Information:** TBC

**Term:** TBC

**Course Day and Time:** TBC

**Office Hours:** TBC

### Grading & Assessment

The instructor assesses students' mastery of course learning objectives by using the forms of assessment below. Each of these assessments is weighted toward the final grade. The Assessment Overview section provides further details for each.

**Engagement – 20%**

**Presentation 1 – 20%**

**Presentation 2 – 20%**

**Presentation 3 – 20%**

**Case Study Analysis Report – 20%**

### Assessment Overview

This section provides a brief description of each form of assessment listed above. Forms of assessment may be slightly modified in the term syllabus.

**Engagement (20%):** Students are expected to be engaged in class, to have read the CEA CAPA Engagement Policy, and to understand the [Class Engagement Rubric](#) that outlines how engagement is graded.

**Presentation 1 (20%):** Students will be allocated topics to present and actively participate in class discussions, during and after the presentations. They will be assigned to a specific industry (e.g., healthcare, finance, transportation, education, retail). After conducting research and discussing how AI is used in their assigned industry, students will create a brief presentation (15 minutes) to share with the class. Slides must be submitted via Canvas.

**Presentation 2 (20%):** Students will be shown video clips or case studies that highlight ethical dilemmas related to AI, such as bias in algorithms or privacy concerns. They will be assigned a specific ethical issue related to AI, and must identify different perspectives and potential solutions. The 15-minute presentations will be on the ethical considerations surrounding the use of AI in society. Slides must be submitted via Canvas.

**Presentation 3 (20%):** Students will analyse one or two resources on the future of AI and its potential impact on society. They will then research and present their thoughts about their predictions and concerns about the future of AI. Presentations will also be 15 minutes long. Slides must be submitted via Canvas.

**Case Study Analysis Report (20%):** Students will analyse a case study of a business using AI experimentation to improve its operations. This involves analysing the case study and identifying the techniques used. Also, students must make recommendations based on the impact of AI experimentation on the business's success. The report must be submitted via Canvas.

## Active Learning

Experiential learning is an essential component of education abroad, and participation in field studies is a required part of coursework. In this course, students explore the city in which they are studying using a variety of methods. This provides the opportunity to gain nuance and perspective on the host context and course content, as well as to collect information and resources for assigned papers, projects, and presentations. The course offers:

- Museum Visit

## Readings and Resources

The below readings and resources are representative of what will be assigned as required in this course, but may vary slightly in the term syllabus.

All students are given access to the online library of the University of New Haven (UNH), accessible [here](#), and are expected to comply with [UNH Policies](#) regarding library usage.

Wherever possible, required readings are made accessible through the online library or Canvas. Students are responsible for obtaining all required readings.

Each course utilizes Canvas as its LMS. Students are expected to check Canvas regularly for updates and deadlines. Canvas is also the primary platform for contacting your instructor in case of questions or concerns about the course.

### Required

Fanni, S. C., Febi, M., Aghakhanyan, G., & Neri, E. (2023). Natural language processing. In *Introduction to Artificial Intelligence* (pp. 87-99). Cham: Springer International Publishing.

Foster, D. (2022). *Generative deep learning*. O'Reilly Media, Inc.

Fui-Hoon Nah, F., Zheng, R., Cai, J., Siau, K., & Chen, L. (2023). *Generative AI and ChatGPT*:

Applications, challenges, and AI-human collaboration. *Journal of Information Technology Case and Application Research*, 25(3): 277-304.

Kakani, V., Nguyen, V. H., Kumar, B. P., Kim, H., & Pasupuleti, V. R. (2020). A critical review on computer vision and artificial intelligence in food industry. *Journal of Agriculture and Food Research*, 2, 100033.

Larsson, S. (2020). On the governance of artificial intelligence through ethics guidelines. *Asian Journal of Law and Society*, 7(3), 437-451.

Ness, S., Shepherd, N. J., & Xuan, T. R. (2023). Synergy Between AI and Robotics: A Comprehensive Integration. *Asian Journal of Research in Computer Science*, 16(4): 80-94.

Noy, S., & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. *Science*, 381(6654): 187-192.

Nozari, H., Ghahremani-Nahr, J., & Szmelter-Jarosz, A. (2024). AI and machine learning for real-world problems. In Shiho Kim & Ganesh Chandra Deka. *Advances In Computers* (pp. 1-12). Elsevier.

Sætra, H. S. (2023). Generative AI: Here to stay, but for good? *Technology in Society*.  
<https://doi.org/10.1016/j.techsoc.2023.102372>

Thomas, Mike. (2024, March 13). *The Future of AI: How Artificial Intelligence Will Change the World*.  
<https://builtin.com/artificial-intelligence/artificial-intelligence-future>

Valmeekam, K., Marquez, M., Sreedharan, S., & Kambhampati, S. (2023). On the Planning Abilities of Large Language Models - A Critical Investigation. *ArXiv*, <https://arxiv.org/abs/2302.06706v1>

## Course Calendar

Session 1	
Topics	Introduction  What is AI and its impact on Society?
Activity	Students will share their initial thoughts on artificial intelligence (AI).  Explore AI as the simulation of human intelligence processes by machines, especially computer systems. Discuss how can AI perform tasks such as learning, problem-solving, and decision-making.
Readings & Assignments	Reading: Sætra, H. S. (2023). Generative AI: Here to stay, but for good? <i>Technology in Society</i> . <a href="https://doi.org/10.1016/j.techsoc.2023.102372">https://doi.org/10.1016/j.techsoc.2023.102372</a>  Assignment: Start preparing Presentation 1

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Session 2	
Topics	AI Applications  Identify and explain various applications of artificial intelligence in technology
Activity	Students are allocated a specific AI technology application (e.g. virtual assistants, autonomous vehicles, facial recognition) Students research and prepare a short presentation on their assigned application, including how it works, its benefits, and potential drawbacks
Readings & Assignments	Reading: Fui-Hoon Nah, F., Zheng, R., Cai, J., Siau, K., & Chen, L. (2023). Generative AI and ChatGPT: Applications, challenges, and AI-human collaboration. <i>Journal of Information Technology Case and Application Research</i> , 25(3): 277-304.  Assignment: Continue preparing Presentation 1

Session 3	
Topics	AI and Machine Learning  Define machine learning Identify the different types of machine learning Understand the basic concepts and processes involved in machine learning algorithms
Activity	Presentation 1
Readings & Assignments	Reading: Nozari, H., Ghahremani-Nahr, J., & Szmelter-Jarosz, A. (2024). AI and machine learning for real-world problems. In Shiho Kim & Ganesh Chandra Deka. <i>Advances In Computers</i> (pp. 1-12). Elsevier.

Session 4	
Topics	AI and Natural Language Processing (NLP)  Define NLP and explain its applications Identify common NLP techniques and tools Analyse and manipulate text data using NLP algorithms
Activity	Divide students into small groups. Students will be provided with a list of common NLP tools and techniques Students will research and explore one tool/technique assigned to them Students investigate its functionality, advantages, and applications in NLP

Readings & Assignments	<p>Readings: Fanni, S. C., Febi, M., Aghakhanyan, G., &amp; Neri, E. (2023). Natural language processing. In <i>Introduction to Artificial Intelligence</i> (pp. 87-99). Cham: Springer International Publishing.</p> <p>Assignment: Start preparing Presentation 2</p>
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Session 5	
Topics	<p>Generative AI and Deep Learning</p> <p>Define deep learning and explain its significance in the field of artificial intelligence Identify the key components of deep learning algorithms, such as neural networks and activation functions Apply deep learning concepts to real-world problems</p>
Activity	<p>Students will be allocated a showcase of real-world applications of deep learning, such as self-driving cars, healthcare diagnostics, and language translation. Students, in groups, will discuss the challenges and ethical considerations of implementing deep learning in these applications. Students brainstorm their own ideas for applying deep learning to solve complex problems in various industries.</p>
Readings & Assignments	<p>Reading: Foster, D. (2022). <i>Generative deep learning</i>. O'Reilly Media, Inc.</p> <p>Assignment: Continue preparing Presentation 2</p>

Session 6	
Topics	<p>Exploring Large Language Models (LLM)</p> <p>Understand the concept of Large Language Models (LLM) and their applications Analyze the benefits and drawbacks of using LLM in various contexts Create your own simple LLM using a pre-trained model</p>
Activity	Presentation 2
Readings & Assignments	<p>Reading: Valmeekam, K., Marquez, M., Sreedharan, S., &amp; Kambhampati, S. (2023). On the Planning Abilities of Large Language Models - A Critical Investigation. <i>ArXiv</i>, <a href="https://arxiv.org/abs/2302.06706v1">https://arxiv.org/abs/2302.06706v1</a></p>

Session 7	
Topics	Midterm Break

Session 8	
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Topics	<p>Robotics and AI</p> <p>Define robotics and artificial intelligence</p> <p>Understand the basic components and functions of a robot</p>
Activity	<p>Robot Building - This activity will help students understand the basic components and functions of a robot</p> <p>Divide the students into small groups and provide each group with a robotics kit</p> <p>Instruct the students to build a simple robot using the components provided</p> <p>Encourage students to experiment with different configurations and functionalities</p>
Readings & Assignments	<p>Reading: Ness, S., Shepherd, N. J., &amp; Xuan, T. R. (2023). Synergy Between AI and Robotics: A Comprehensive Integration. <i>Asian Journal of Research in Computer Science</i>, 16(4): 80-94.</p> <p>Assignment: Start preparing Presentation 3</p>

Session 9	
Topics	<p>Computer Vision and AI</p> <p>Define computer vision and its importance in AI</p> <p>Discuss the various applications of computer vision in industries such as healthcare, automotive, and security</p> <p>Explain the key concepts of image processing, feature extraction, and object detection</p>
Activity	<p>Students form into teams and are present with a real-world image recognition challenge</p> <p>Each team must develop a computer vision model to recognize specific objects within a given set of images</p> <p>Teams will present their results and discuss the effectiveness of their models</p>
Readings & Assignments	<p>Reading: Kakani, V., Nguyen, V. H., Kumar, B. P., Kim, H., &amp; Pasupuleti, V. R. (2020). A critical review on computer vision and artificial intelligence in food industry. <i>Journal of Agriculture and Food Research</i>, 2, 100033.</p> <p>Assignment: Continue preparing Presentation 3</p>

Session 10	
Topics	AI and Experimentation
Activity	Presentation 3

Readings & Assignments	<p>Reading: Noy, S., &amp; Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. <i>Science</i>, 381(6654): 187-192.</p> <p>Assignment: Start preparing the Case Study Analysis Report</p>
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Session 11	
Topics	Guest Lecture

Session 12	
Topics	<p>AI and Ethics</p> <p>Understand the ethical implications of artificial intelligence in society Analyze and discuss various ethical dilemmas related to AI Apply ethical principles to real-world scenarios involving AI</p>
Activity	<p>Students are formed into groups and provided with a set of ethical dilemma scenarios related to AI Students discuss and analyze these scenarios, considering the ethical principles introduced in the topic materials</p>
Readings & Assignments	<p>Reading: Larsson, S. (2020). On the governance of artificial intelligence through ethics guidelines. <i>Asian Journal of Law and Society</i>, 7(3), 437-451.</p> <p>Assignment: Continue preparing the Case Study Analysis Report</p>

Session 13	
Topics	AI and the Future
Activity	Case Studies Analysis Report Presentation
Readings & Assignments	<p>Reading: Thomas, Mike. (2024, March 13). <i>The Future of AI: How Artificial Intelligence Will Change the World</i>. <a href="https://builtin.com/artificial-intelligence/artificial-intelligence-future">https://builtin.com/artificial-intelligence/artificial-intelligence-future</a></p> <p><b>Case Study Analysis Report Due</b></p>

Session 14	
Field Study	

Session 15	



## Section III: Academic Policies and Standards

### Academic Policies

Students are expected to review and understand all CEA CAPA student policies, including our [Academic Policies](#) and [Engagement Policy](#). CEA CAPA reserves the right to change, update, revise, or amend existing policies and/or procedures at any time. Additional requirements that may be associated with a specific course or program are addressed in the term syllabus.

### Student Learning & Development Objectives

CEA CAPA has identified [Student Learning and Development Objectives \(SLDOs\)](#) for all programs in all locations: content in context, navigating differences, power and equity, critical thinking and intellectual curiosity, career and professional development, and sustainability and migration. These are meta-level learning objectives that transcend coursework and are infused across all elements of program delivery, beyond specifics of course offerings, addressing student learning holistically and framing it a larger learning context.