SYLLABUS FOR HCSC 255 DISCOVER AI (ARTIFICIAL INTELLIGENCE)

Instructor: Yvonne Phillips

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Class time: 5:30 pm – 6:30 pm Eastern Time, Synchronous, virtual via Zoom: Join Zoom link here

Duration: Fall 2021 semester, August 30th – December 10th, 2021

Department: Computer Science elective; 1 credit hour for Morehouse Residential students. AUC DSI Participation & Badge for Morehouse Online, Spelman and Clark Atlanta students.

Two-step registration:

1. Register for HCSC 255, Morehouse College
2. Apply for AI4ALL (automatic entry)

Course Materials: Found on GitHub (location will be provided)

Assignments should be emailed to discoveraihmk@gmail.com

Course Description:

Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. AI aims to help humans work more efficiently by taking on some of their tasks. It's achieved by AI programs utilizing some very human-like characteristics themselves. Simply, the goal of AI is to make a computer that can learn, plan, and solve problems autonomously. Learning exactly what makes this field so fascinating and so useful to our problems today can be the key to unlocking the vast possibilities (and risks) that technology has always provided. Using tech to make our machines more human has a wide variety of implications but at the end of the day, these machines remain tools for our use.

HCSC 255, Discovery AI, is a unique research-based course that pairs with AI4ALL College Pathways to focus on developing projects as an active mechanism to dive into the applications of AI. The core research topics in AI include problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming, machine learning, and so on. Unquestionably, these topics are closely linked with each other. Your investigations will leverage the aforementioned topics with real world applications. Though this course is largely non-technical, you will have the opportunity to learn the fundamentals of the Python programming language and learn how to build a model in Python using standard libraries.

Course Learning Objective:

- A comprehensive guide to the basics of AI and machine learning
- The meaning behind common AI terminology, including neural networks, machine learning, deep learning, and data science
- What AI realistically can--and cannot--do
- How to spot opportunities to apply AI
- How to navigate ethical and societal discussions surrounding AI
- Develop machine learning and data science projects
- Gain an overview of the Python programming language using virtual classroom platform (VCL)

Statistics in AI per industry: "131 Myth-Busting Statistics on Artificial Intelligence (AI) in 2021"

Course Evaluation:

Your final grade will be determined by the number of points you collect. You can collect various amounts of points for the different parts of the class:

a. *Morehouse Residential students*:

Attendance (including participation): 15%

AI4ALL completion: 40%

Case Study work: 25%

Research project: 20%

b. *Morehouse Online, Spelman and CAU students*: To receive AUC DSI badge,

Attendance (including participation) and completion of all HCSC 255 coursework: 100%

Background literature review (BLR):

The course schedule includes required readings. The goal of the reading assignments is to prepare for class, to familiarize yourself with new terminology and definitions, and to determine which part of the subject needs more attention. Use the articles to think critical of how Artificial Intelligence is being or can be used.

Case studies:

Use cases add value because they help explain how the system should behave and, in the process, they also help brainstorm what could go wrong. They provide a list of goals, and this list can be used to establish the cost and complexity of the system. This case method course fosters your analysis skills. Your assignments focus on answering questions and analyzing the situation presented. This approach to the course bridges theory to practice, and promotes the development of skills including communication, active listening, critical thinking, decision-making, and the awareness of your thought process. The ultimate goal is understanding impactful technology decisions affecting Black Society; discrimination and bias, adverse uses of AI, AI and developing economies and AI and jobs. What are the drivers, risk, restraints, and opportunities?

a. Discuss advancements
b. Discuss drawbacks
c. Discuss the future

Reflection papers:

Each week the week's background literature reviews should be studied, then choose a case study from the list and write a reflection paper. Your writings should be about the texts you read and help make a concrete and personalized connection with ideas in the text.

Your reflections should include:

a. What did you learn?
b. What did you find interesting?
c. What was confusing?

Research project:

The final project is individual contribution. You will investigate and write a research paper on an issue found in the black community and how areas of AI will affect the issue positively and negatively. Students may find their own ideas for projects. Further guidelines for the paper will be given out at a later date.

Collaboration Policy:
You are welcome to discuss the course's ideas, and material with others in order to better understand it, but the work you turn in must be your own. For example, you must write your own code, run your own data analyses, and communicate and explain the results in your own words and with your own visualizations. You may not provide or make available solutions to homework to individuals who take or may take this course in the future.

Missed Activities and Assignment Deadlines:

Projects and homework must be turned in on time, with the exception of extended days for homework as stated below. It is important that everybody attends and proactively participates in class. I understand, however, that certain factors may occasionally interfere with your ability to participate or to hand in work on time. If that factor is an extenuating circumstance, I will ask you to provide documentation directly issued by the University, and we will try to work out an agreeable solution together.

Homework Deadlines and Late Days:

In the weeks when homework is due, it must be sent in at the beginning of class, unless otherwise announced. Each student is given one late day for homework at the beginning of the semester. A late day extends the individual homework deadline by 24 hours without penalty. Assignments handed in more than 24 hours after the original deadline will not be graded with reduced points. Late days are intended to give you flexibility: you can use it for any reason no questions asked. You don't get any bonus points for not using your late day. Also, you can only use the late day for the individual homework deadlines all other deadlines (e.g., project milestones) are hard.

Academic Integrity:

Academic integrity will be strongly enforced in this course. Any student who violates the University's standard of conduct relating to academic integrity will receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office of Student Standards and Accountability.

The instructor reserves the right, when necessary, to modify the syllabus: alter the grading policy, and modify the course content. Modifications will be announced and discussed in class.

Course Schedule

Week 1, *August 30th: Introduction and Course Outline*

- Course Overview
- Brief history of Artificial Intelligence
- What is Artificial Intelligence?
- **In-class article read (group discussion):**
  "'Big data and artificial intelligence: a quick comparison", Algorithmia, March 3, 2020,

- **Homework** – *read the two articles below and write a one-page reflection paper (see pg.2-3)* ***Due September 8th***
  1. "We're in a diversity crisis", cofounder of Black in AI on what's poisoning algorithms in our lives, Jackie Snowarchive, February 14, 2018,
  2. "ARTIFICIAL INTELLIGENCE AND ALGORITHMS: 21ST CENTURY TOOLS FOR RACISM" , Samara Lynn, April 30, 2019

Week 2: *Types of Artificial Intelligence (class instruction date change to Sept. 8th (Labor Day, Sept. 6th))*

Week 3: *September 13th, Bias in AI*

- BLR:
  - "Disastrous' lack of diversity in AI industry perpetuates bias, study finds", Kari Paul, April 2019
  - "Bias in AI: What it is, Types & Examples of Bias & Tools to fix it", Cem Dilmegani, updated August 9, 2021
  - "Artificial Intelligence Has a Problem With Gender and Racial Bias. Here's How to Solve It", Joy Buolamwini, February 7, 2019
  - "Three notable examples of AI bias", Michael McKenna, Toptal, October 14, 2019

Week 4: *September 20th, Guest Lecturer: A Conversation with Diya Wynn, AI Ethicist, Amazon*

Week 4: *September 24th, 6:30pm ET, AI4ALL, 1st lecture, See EdSTEM platform*

Week 5: *September 27th, 5:30pm ET, AI4ALL Lab*

Week 6: *October 4th, 5:30pm ET, Fundamentals in Python – with Justin De La Cruz*
***Ensure you have created log-in with the AUC Data Science Virtual Computer Lab*

Week 6: *October 4th, AI4ALL, 6:30pm ET, AI4ALL, 2nd* lecture, See EdSTEM platform

Week 7: *October 11th, 5:30pm ET, AI4ALL Lab*

Week 8: *October 18th, 5:30pm ET,*
Cybersecurity

- *BLR:* "Minorities in Cybersecurity: The Importance of a Diverse Security Workforce", Susan Morrow, May 29, 2018

- Use Cases:
  - "AI & ML in Cybersecurity: Top 5 Use Cases & Examples", Artificial Intelligence, Machine Learning, June 5, 2020
  - "Machine Learning and AI: Cybersecurity Use Cases", Christopher J Hodson, June 14, 2019

Media and Entertainment

- BLR:
  - "AFRICAN AMERICAN SPENDING POWER DEMANDS THAT MARKETERS SHOW MORE LOVE AND SUPPORT FOR BLACK CULTURE", Nielsen, September 12, 2019
  - "How the media and entertainment industry is addressing systemic racism", Marcus Burke, July 24, 2020
  - "Racial Bias and Media Coverage of Violent Crime", Lisa Wade, PhD, April 9, 2015

- White paper:
  - "Racism and the Media: A Textual Analysis", Kassia E. Kulaszewicz, May 2015
- Use Cases:
  - "Examples of Chatbots and AI in Media and Entertainment Industry", Srirupa Ganguly
  - "AI as Magnet for Customers in Entertainment if Used Wisely", Katrine Spirina, January 20, 2020,

Week 8: ***October 18th, AI4ALL, 6:30pm ET, AI4ALL, 3rd lecture, See EdSTEM platform***

Week 9: ***October 25th, 5:30pm ET, AI4ALL Lab***

Week 10: ***November 1st, 5:30pm ET,***
Banking, Financial Services, and Insurance

- BLR:
  - "AI Voice Assistants May Perpetuate Gender Bias", February 21, 2021

- Use Cases:
  - "Artificial Intelligence for BFSI Sector"
  - "AI in Financial Services", CIOpages.com

Manufacturing

- BLR:
  - "The 6 Challenges of Implementing AI in Manufacturing", Ryohei Fujimaki, December 2, 2020
- Use Cases
  - "Top 10 Use cases of Artificial Intelligence In Manufacturing", sysadmins, February 10, 2021

Week 10*: November 1st, 6:30pm ET, AI4ALL, 4th lecture, See EdSTEM platform*

Week 11*: November 8th, 5:30pm ET, AI4ALL Lab*

Week 12*: November 14th, AI4ALL, Final Project Presentation due, See EdSTEM platform*

Week 12*: November 15th, AI4ALL, 5:30 - 7:30pm ET, Final Showcases, See EdSTEM platform*

Week 13: November *22nd, 5:30pm*

Telecommunication & IT

Artificial intelligence applications are among the latest trends in the telecom industry, increasingly helping CSPs manage, optimize, and maintain not only their infrastructure, but their customer support operations as well.

- BLR:
  - "7 Dangerous Risks of Artificial Intelligence", Mike Thomas, Updated: July 28, 2021
- Use Cases:
  - "TELECOMMUNICATIONS INDUSTRY IS EVOLVING WITH ARTIFICIAL INTELLIGENCE", Puja Das, December 12, 2020.
  - "AI as a Competitive Advantage in the Telecom Industry", Kristijonas Žibutis, March 19, 2019

Cybersecurity

- BLR:
  - "Minorities in Cybersecurity: The Importance of a Diverse Security Workforce", Susan Morrow, May 29, 2018

- Use Cases:
  - "AI & ML in Cybersecurity: Top 5 Use Cases & Examples", Artificial Intelligence, Machine Learning, June 5, 2020
  - "Machine Learning and AI: Cybersecurity Use Cases", Christopher J Hodson, June 14, 2019

Week 14: *November 29th, 5:30pm ET, Healthcare*

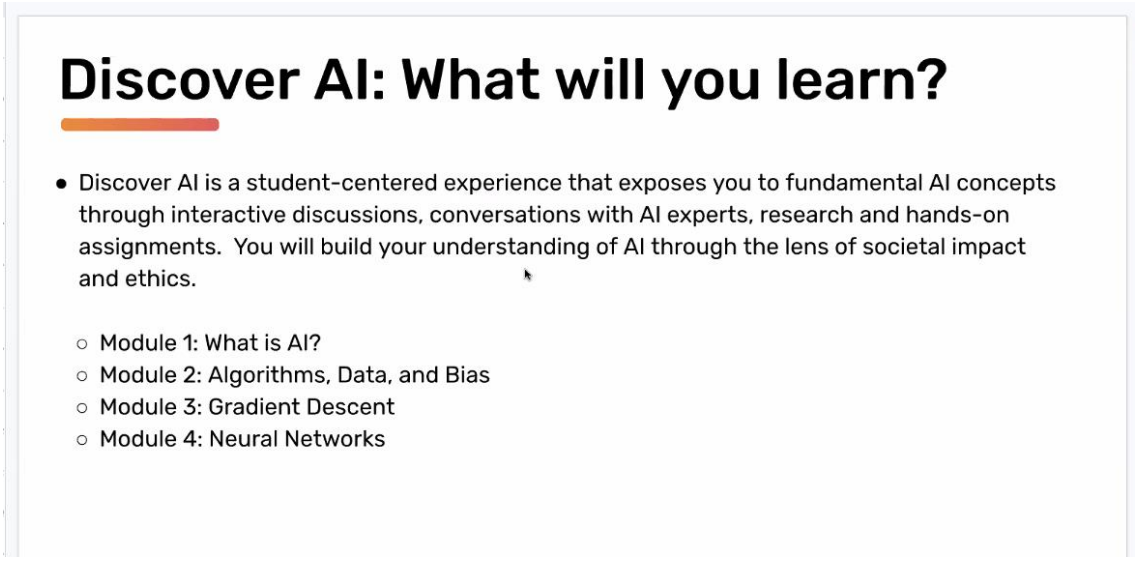
- BLR:
  - "Can AI tackle racial inequalities in healthcare?", Cody Godwin, February 6
  - "A biased algorithm is delaying healthcare for black people in the US", Jessica Hamzelou, October 25, 2019

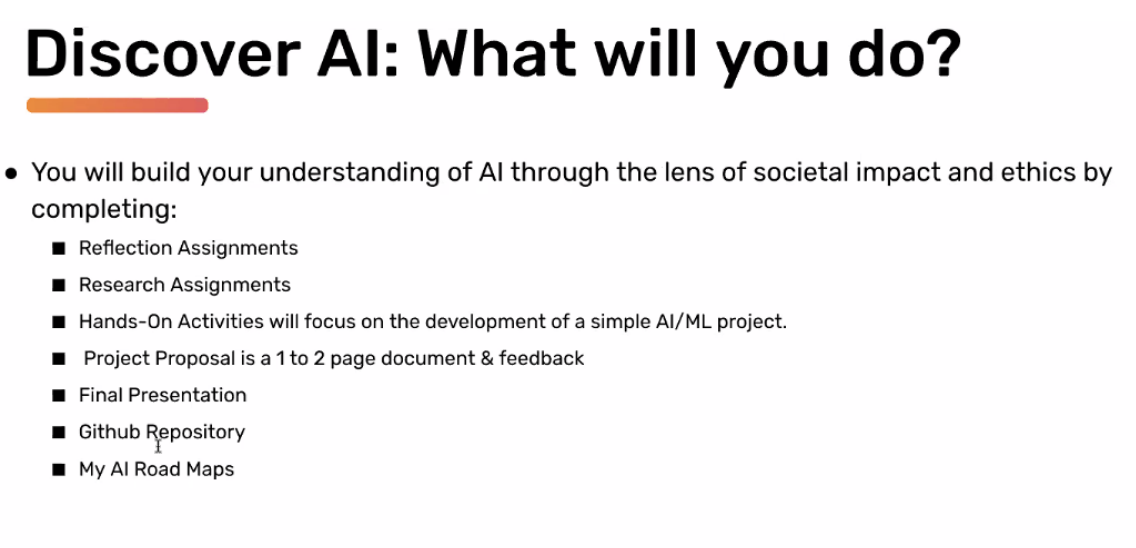
- Use Cases
  - "Top 20 AI Use Cases: Artificial Intelligence in Healthcare", Claudio Buttice, November 13, 2020

AI4ALLCollege Pathways: https://ai-4-all.org/college-pathways/

Duration: September 21st – November 16th, 2021

The focus on this course is, how can Artificial Intelligence impact our world?


Discover AI: What will you learn?
Discover AI is a student-centered experience that exposes you to fundamental AI concepts through interactive discussions, conversations with AI experts, research and hands-on assignments. You will build your understanding of AI through the lens of societal impact and ethics.
Module 1: What is AI?
Module 2: Algorithms, Data, and Bias
Module 3: Gradient Descent
Module 4: Neural Networks


Discover AI: What will you do?
You will build your understanding of AI through the lens of societal impact and ethics by completing:
Reflection Assignments
Research Assignments
Hands-On Activities will focus on the development of a simple AI/ML project.
Project Proposal is a 1 to 2 page document & feedback
Final Presentation
Github Repository
My AI Road Maps

Discover AI: "Chat with An Expert Series"

- The Chat with an Expert Series is an interactive virtual experience that gives AI4ALL's Discover AI and Apply AI students an opportunity to connect with artificial intelligence role models who are artificial intelligence experts in industry, research and policy.
- These 30-minute conversations are meant to excite students about the diverse possibilities of artificial intelligence and inform them of the latest trends in industry, research and policy while exposing the successes and challenges of developing ethical AI solutions.
- Launched in Fall 2020, we've welcomed experts from Accenture, Oracle, Capitol One, IBM, Simpa, Lexis Nexis, Airbnb, etc.