# Syllabus ICS625 Artificial Intelligence and Machine Learning

# Online - Summer 2023

**Instructor Name: Kenneth McNamara**

**Instructor Contact Information:**

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| Email: kenneth.mcnamara@bsu.edu | Telephone: 765-610-3372 Text first, Urgent only |
| Canvas Address: <https://bsu.instructure.com> | Zoom Personal Room: [https://bsu.zoom.us/my/**kenneth.mcnamara**](https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Fbsu.zoom.us%2Fmy%2Fkenneth.mcnamara&data=05%7C01%7Ckenneth.mcnamara%40bsu.edu%7C3212363f2b9042fdb7b208db46560bba%7C6fff909f07dc40da9e30fd7549c0f494%7C0%7C0%7C638181107596429308%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=23VhpYYP8pQ%2FQcCidk719jYLjlD38gilmOe8%2B2BqLI4%3D&reserved=0) |
| Virtual Office Hours 8PM – 10PM Thursday (text first) Other times by appointment | Program/Department CICS Ball State University, Muncie |

**Instructor Bio:** US Navy Reserve 1967-1973, Master of Science CICS BSU 1994, Retired AT&T Senior Network Engineer 2012, Coolant Wizard Manufacturing Technician Current

# Course information

**Course Description**: This course is intended as a deep dive into the current applications of AI and Machine Learning in industry. The objective of this class is to combine technical aspects of AI with existing successful implementations of AI to create a framework that will allow the student to evaluate, recommend or troubleshoot existing or potential AI implementations.

This course is a “tech-management” course, not a technical course. The objective of this course is to discover the questions to ask when AI comes up; and put those questions into a Framework that enables you to evaluate existing or recommended AI implementations.

The creation of that Framework is the *class assignment*. And represents 16% of the total grade. Students will be expected to work together as a team, openly sharing their research and assignments with the entire class.

**Prerequisites:** The ability to quickly form a team with students who may be strangers and work with those students to create a finished product.

**Course Goals / Learning Outcomes:**

**LO# 1:**  The student will demonstrate the ability to work with ChatGPT or their selected Large Language Model to create finished papers. The student will be able to discuss and explain the advantages and disadvantages of using LLMs. The student will be able to demonstrate competence at creating LLM prompts that make the best use of the LLM tools.

**LO# 2:** The student will be able analyze the case study of an existing AI implementation or suggested AI project and formulate questions that highlight possible failure points as well as positive outcomes. This analysis will include both management and technical aspects of the project.

**Course Modality / Structure:** This is an online course. It is assumed that scheduling even a Zoom group call would be impossible, as a result there won’t be any group meetings. But ad hoc meetings of students to discuss assignments and course material are encouraged since the end result of this course is a group effort.

While the content and objective of this course is fixed, the structure of the course may be changed if as we work together to create the framework and a better process emerges.

**Weekly lesson video and Writing Assignment:**

A weekly lesson video and companion PowerPoint will be posted Sunday afternoon by 3PM. Viewing this lesson video is required as it will be the basis for your weekly writing assignment.

The writing assignments should be completed and posted on the Class Canvas page by Sunday midnight.

**Discussion assignment:**

The first week Discussion assignment will be an opportunity to get acquainted, ask questions and get comfortable with Canvas.

After that, the weekly Discussion assignment will be for each student to post their writing assignment and comment on at least 3 others.

The objective of this assignment is NOT classical Peer Review. Rather, the student is asked to read the finished paper and compare it to the LLM generated paper.

As a class we want to answer the question – will LLMs, such as ChatGPT, make us better writers or do the writing for us?

For additional detail please see the assignment in Canvas.

**Required Reading:**

The book “*Working with AI – Real Stories of Human-Machine Collaboration*” by Davenport and Miller is the one required reading assignment. Ideally the student should ***read the book in its entirety by Sunday 5/28/2023***.

**Course Time Commitment**: It is expected that students will spend approximately 2 hours of study time outside of class for every one hour in class. Since this is a 3 hour class, you should expect to study an average of 6 hours outside of class each week.

The content of this course is being built on top of an existing AI course that was created and taught by Professor Frank Groom. The video lectures and PowerPoint material from that course are available online. Professor Groom’s course required the student to create algorithms for each week’s material. The current version of this course will not use that approach.

One of Professor Groom’s videos will be assigned each week. Students should watch the video and keep notes on copies of his PowerPoint presentations. There will be no test on this material.

# Course materials

1. “*ICS625 Artificial Intelligence and Machine Learning –Video Lectures and PPT slides*” by Professor Frank Groom (Posted on Class Canvas page)
2. “*Working with AI – Real Stories of Human-Machine Collaboration*” by Davenport and Miller
3. *“Artificial Intelligence: A Modern Approach 3rd ed”.*, Pearson, 2010. By Russell Stuart and Peter Norvig
4. GITHUB Website: [Curated Papers about Data Science & Machine Learning](https://github.com/eugeneyan/applied-ml)

Additional reading references are included at the end of this document.

# Course assignments and assessments

**Assignment Schedule**

(Completion of the Weekly writing assignment is proof of attendance)

(Detail about assignments will be provided in the weekly lesson videos and PPts)



# Course statements and policies

**Participation Policy**

* This course is designed with weekly activities, discussion, and other forms of regular collaboration and communication.
* It is recommended that you log into your course 3 to 4 times a week and check your official Ball State email account daily to view announcements and prepare for class.
* Complete all assignments, quizzes, tests, and any other activities by the stated due dates.

**Feedback Policy**

* I will respond to email from your official Ball State email address within 24 hours during week days (Monday-Friday) and within 48 hours on the weekend.
* I will read every discussion post but I will not always personally comment on posts.
* I will grade your assignments no later than within 5 business days of submission.
* Contact me directly if you have questions or concerns about your performance in class.

**Late Assignment Policy**

* All assignments are due by midnight EST/EDT time on the due dates indicated.
* If you can’t meet the due date for a writing assignment please contact me to work something out. We all need deadlines but jobs and family commitments can get in the way.
* Internet connectivity and technical issues may occur and impede you from turning in work on time. Call my phone when this occurs.
* You have one (1) permitted late assignment to allow for these issues, to which you can turn in one assignment 24 hours late.
* Canvas will not accept assignments for grading after 11:59 pm on the final day of class.

**Assignment Submission Policy**

* All assignments should be submitted as Word documents with extensions of .doc or .docx unless otherwise indicated in the assignment description.
* Assignments, unless otherwise indicated, should be submitted using the assignment link in the module**.**

**Grading Policy**

It is my policy that appropriate evaluation of your academic performance is an integral part of your learning experience. In the absence of mistake, fraud, bad faith or incompetence, I will be the key decision-maker on the assignment of grades. For information concerning grade appeals, [consult the Ball State website](https://www.bsu.edu/about/administrativeoffices/associateprovost/student-services/grade-appeal).

**Grade Distribution**

The Grading scale for this course - based on 256 possible total points:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Total Points | | | Letter Grade | | | ~% | |
| 238 | - | 256 |  | A |  | 93% | 100% |
| 230 | - | 237 |  | A- |  | 90% | 93% |
| 222 | - | 229 |  | B+ |  | 87% | 89% |
| 212 | - | 221 |  | B |  | 83% | 86% |
| 204 | - | 211 |  | B- |  | 80% | 82% |
| 197 | - | 203 |  | C+ |  | 77% | 79% |
| 179 | - | 196 |  | C |  | 70% | 77% |

# university policies

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**Diversity Statement**

Ball State University aspires to be a university that attracts and retains a diverse faculty, staff, and student body. We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our [Beneficence Pledge](https://www.bsu.edu/about/administrativeoffices/student-conduct/policiesandprocedures/beneficence) and through university resources found at [the](http://cms.bsu.edu/campuslife/multiculturalcenter) Multicultural Center website.

**Disability Services Statement**

If you need course adaptations or accommodations because of a disability, please contact Disability Services as soon as possible. The [Office of Disability Services](https://www.bsu.edu/about/administrativeoffices/disability-services) coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or [dsd@bsu.edu](mailto:dsd@bsu.edu).

**Attendance Policies**

Completion of the ICS625 weekly writing assignment is proof of attendance.

**Ball State Academic Ethics Policy**

Honesty, trust, and personal responsibility are fundamental attributes of the university community. Academic dishonesty and other forms of academic misconduct threaten the foundation of an institution dedicated to the pursuit of knowledge and will not be tolerated. To maintain its credibility and reputation, and to equitably assign evaluations of scholastic and creative performance, Ball State University is committed to maintaining a climate that upholds and values the highest standards of academic integrity. Visit the complete [Student Academic Ethics Policy](https://www.bsu.edu/about/administrativeoffices/vice-provost/student-services/academic-integrity).

**Plagiarism Policy**

Plagiarism is not acceptable, unless otherwise indicated for all assignments, you must work independently by yourself. Sharing of files is not permitted for any reason.

**Potential Violations**

Examples of academic integrity violations include but are not limited to:

* Working with another person on any assignment other than authorized group projects.
* Sharing or allowing others to access your files, whether done with permission or not.
* Use or possession of a file created by someone else.
* Reusing work from another semester, course, or section.
* Fraudulent submission of work.
* Using unauthorized materials during Exams.
* Impersonating someone else or having them impersonate you.
* Making fraudulent or dishonest statements regarding your work.
* Soliciting others to complete work for you.
* Posting course files and resources on study or content sharing websites.

[The Plagiarism Tutorial from UNC Libraries](http://www.lib.unc.edu/instruct/plagiarism/) provides you with a great foundation in Academic Integrity.

**FERPA and Privacy**

As a student, your educational records are considered confidential. Under FERPA (Family Educational Rights and Privacy Act), your records are confidential and protected. Under most circumstances, your records will not be released without your written and signed consent. However, some directory information may be released to third parties without your prior consent unless a written request to restrict this is on file. You can learn more about student rights to privacy by reading [Ball State's FERPA and Privacy and Protection](https://www.bsu.edu/about/administrativeoffices/student-conduct/policiesandprocedures/ferpa).

**Video Conferencing Recording**

In this class, software may be used to record live class discussions. As a student in this class, your participation in live class discussions may be recorded. These recordings typically will be made available only to students enrolled in the class, to assist those who cannot attend the live session or to serve as a resource for those who would like to review content that was presented. Students who prefer to participate via audio only will be allowed to disable their video camera so only audio will be captured. Students who prefer to listen only must disable their audio capability and visual camera. If you have concerns, please discuss these options with me.

# academic support services

**The Writing Center**  
All writers improve with practice and feedback, so as a student in this course, you are encouraged to use the Writing Center (in Robert Bell 295, Bracken Library, or online) to get additional feedback on your writing. To schedule a free appointment to discuss your writing, go to [www.bsu.edu/writingcenter](http://www.bsu.edu/writingcenter). Online and in-person appointments are available seven days a week; however, plan ahead because appointments book quickly!

**The Learning Center**

The Learning Center offers free Tutoring and Academic Coaching for many courses at Ball State. Students can make appointments for online (Zoom) or in-person (NQ 350) appointments. All students are required to wear masks in the Learning Center. To make an appointment, visit my.bsu.edu and click on “TutorTrac” in the Additional Tools section, or just go directly to [https://ballstate.go-redrock.com](https://ballstate.go-redrock.com/).

Testing accommodations for students with disabilities are available for students who have received the appropriate documentation from Disability Services. Tests may be administered in the Learning Center.

Supplemental Instruction is available in select courses. If you have an SI leader for your course, that person will provide students with information the first week of school regarding weekly study sessions. For more information about all of our programming, visit [bsu.edu/learningcenter](https://www.bsu.edu/academics/collegesanddepartments/universitycollege/learningcenter) or call 765-285-1006. Follow us on Instagram: BallStateLC.

# subject to change statement

This syllabus and schedule are subject to change in the event of extenuating circumstances.

Additional materials for ICS625:

**I. Artificial Intelligence:**

**Books:**

Heaton, Jeff, Artificial Intelligence for Humans Vol 1: Fundamental Algorithms, Heaton Research, 2013

Heaton, Jeff, Artificial Intelligence for Humans Vol 2: Nature-inspired algorithms; Heaton Research, 2014

Heaton, Jeff, Artificial Intelligence for Humans Vol 3: Deep learning and neural networks; Heaton Research, 2015

Luger, George, Artificial Intelligence, Structures and Strategies for Complex Problem Solving, Pearson, Addison Wesley

McGovern, Tim, Artificial Intelligence Now, O’Reilly, 2018.

Russell, Stuart and Peter Norvig, Artificial Intelligence: A Modern Approach 3rd ed., Pearson, 2010.

Turban, Efraim, Decision Support and Expert Systems, 9th edition, MacMillan, 2010.

Winston, Patrick Henry, Artificial Intelligence, 3rd ed., Addison Wesley Publishing, 1993.

**Classes**

[Conitzer](http://www.cs.duke.edu/~conitzer), Vincent, Introduction to Artificial Intelligence CPS 170, Duke University, spring 2009, https://www2.cs.duke.edu/courses/spring09/cps170/

Klein, Dan, Pieter Abbeel, Artificial Intelligence CS188, University of California, Berkeley, <http://ai.berkeley.edu>

Littman, Michael L., Introduction to Artificial Intelligence COS302, Princeton University, Fall 2001

Seker, Sadi Evern, Introduction to Artificial Intelligence SC290, Smith College, Department of Computer Science, Spring 2017, http://sadievrenseker.com

Littman, Michael L., Introduction to Artificial Intelligence COS302, Princeton University, Fall 2001

Michael L. Littman, COS302 Introduction to Artificial Intelligence, Princeton

Dan Klein and Pieter Abbeel for CS188 Intro to AI at UC Berkeley. [http://ai.berkeley.edu](http://ai.berkeley.edu/).

Michael L. Littman, COS302 Introduction to Artificial Intelligence, Princeton

Bruce Porter et al Introduction to Artificial Intelligence, University of Texas –Austin

Vincent Conitzer, CPS 170: Artificial Intelligence, Duke University

**Articles**

Adshead, Antony, Storage 101: Object Storage versus Block and File, Computer Weekly, <https://www.computerweekly.com/feature/Storage-101-Object-storage-vs-block-vs-file>

Rouse, Margaret, Block Storage, TechTarget, <https://searchstorage.techtarget.com/definition/block-storage>

**II. Machine Learning and Neural Networks**

**Books**

Aggarwal, Charu, Neural Networks and Deep Learning, Springer, 2018.

Charniak, Eugene, Introduction to Deep Learning, MIT Press, 2018.

[*https://download.microsoft.com/download/0/9/6/096170E9.../9780735698178.pdf*](https://download.microsoft.com/download/0/9/6/096170E9-23A2-4DA6-89F5-7F5079CB53AB/9780735698178.pdf)

Heaton, Jeff, Artificial Intelligence for Humans, Vol 3 Deep Learning and Neural Networks, Heaton Research, Inc. 2015.

**Classes**

Fie-Fie Li, Justin Johnson, and Serena Yeung, Training Neural Networks, Stamford.

Fei-Fei Li, Adrej Karpathy Justine Johns – Stanford and the SuperDataScience.com Team, Convolutional Neural Networks, Stamford.

Yuan Lacun, Deep Learning and Structured Prediction, NYU and Facebook

Dr. Şadi Evren Seker, Smith College, CSC 290: Introduction to Artificial Intelligence and Search

Marc D Ranzato, Facebook

**Articles**

Kelleher, John, Brian MacNamee, Aoife D’Arcy, Fundamentals of Machine learning for Predictive Data Analytics, MIT Press, 2015.

Articles

Azure, Machine Learning Essentials, 2019.

Maini, Vishal, Samer Sabri, Machine Learning for Humans, August 19, 2017 **VERY GOOD** [https://medium.com/machine-learning-for-humans/why -machine-learning-matters-6164fafldfl2](https://medium.com/machine-learning-for-humans/why%20-machine-learning-matters-6164fafldfl2)

Van Loon, Ronald, Machine learning Explained, Data Science Center, Jan. 16, 2018,