

# Generative AI for Business

2 Credits

BU.330.760.52

Monday, 8:15 am-11:15 am

3/24/2025-5/12/2025

Spring 2025

Washington, DC

## Instructor

Minghong Xu, PhD

## Contact Information

[xu.minghong@jhu.edu](mailto:xu.minghong@jhu.edu)

## Office Hours

Wednesday 11:30 pm-1:30 pm, and by appointment

## Teaching Assistant

Boxi Jiao [bjjiao1@jh.edu](mailto:bjjiao1@jh.edu)

## Required Texts & Learning Materials

There is *no required* textbook: all class materials will be available on our Canvas website. However, some generative AI books and exercises are very useful.

## Recommended Texts

* **Generative Deep Learning,** 2nd edition, by David Foster;

Publisher: O’Reilly Media (2023), ISBN-13: 978-1098134181

[**https://github.com/davidADSP/Generative\_Deep\_Learning\_2nd\_Edition**](https://github.com/davidADSP/Generative_Deep_Learning_2nd_Edition)

* Generative AI Value Chain. Andy Wu and Matt Higgins. Harvard Business School Background Note 724-355, July 2023. (Revised July 2023.)
* Bloomberggpt: A large language model for finance. Wu, Shijie, et al. *arXiv preprint arXiv:2303.17564* (2023).
* Retrieval-augmented generation for knowledge-intensive nlp tasks. Lewis, Patrick, et al. *Advances in Neural Information Processing Systems* 33 (2020): 9459-9474.

## Course Description

This comprehensive course is designed to immerse students in the dynamic fields of generative AI. By exploring both the theoretical underpinnings and practical applications, students will gain an in-depth understanding of the most advanced AI models and their impact across various business sectors. Knowledge of deep learning is recommended but not required.

Topics include the foundations of text generation, the development of large language models, prompt engineering, retrieval-augmented generation (RAG), agentic AI, the foundations of image generation, multimodal models, as well as the generative AI ecosystem, ethical issues, and its dark side.

The course adopts a learning-by-doing approach. Students will utilize different tools and products, such as Python and Amazon Web Serives (AWS). The focus is on fostering awareness of generative AI technologies, building familiarity through assignments, and developing strategic thinking regarding their application in business.

## Prerequisite(s)

None

## Learning Objectives

By the end of this course, students will be able to:

1. Understand the principles behind generative AI models, including the foundations of text and image generation, and how they can be used to generate new, synthetic datasets that mimic real-world data.
2. Develop the ability to build, train, evaluate, and refine generative AI systems, such as customGPT, RAG, and agentic AI, using state-of-the-art tools and products like AWS and Python.
3. Apply generative AI systems to create new content, such as images, text, and videos, and understand how these applications can be customized for various business domains, including healthcare, finance, marketing, and operations.
4. Critically analyze the strengths and limitations of various generative AI approaches and models.
5. Understand the business implications of generative AI technologies, including how they can drive value, foster innovation, and create competitive advantages.

To view the complete list of the Carey Business School’s general learning goals and objectives, visit the [Carey website](https://carey.jhu.edu/faculty/resources/teaching-learning/learning-assessment).

Attendance  
Attendance and class participation are part of each student’s course grade. Students are expected to attend all scheduled class sessions. Failure to attend class will result in an inability to achieve the objectives of the course. Excessive absence will result in loss of points for participation. Regular attendance and active participation are required for students to successfully complete the course.

Class participation is an important part of learning. If you have a question, it’s likely that others do as well. I encourage *active* participation, and course grades will take into account students who make particularly strong contributions.

## Assignments

| **Assignment** | **Group or Individual** | **Learning Objectives** | **Weight** |
| --- | --- | --- | --- |
| Attendance and participation in class discussion | Individual | 1, 2, 3, 4, 5 | 5% |
| Homework | Individual | 1, 2, 3, 4, 5 | 40% |
| Project | Group | 2, 3, 4, 5 | 30% |
| Final Exam | Individual | 1, 4, 5 | 25% |
| Total |  |  | 100% |

*Homework*: there are four individual homework assignments. Please refer to the tentative schedule table below. All homework assignments should be submitted through the Canvas links.

*Group Projects:* four students form a group and work on the projects as a team. Students can identify a company or a scenario along with its generative AI opportunity and use techniques taught in class to develop and evaluate solutions. Students are required to write a project report, and present in class using Power Point slides. Details and rubrics will be available on Canvas course website.

*Final Exam*: the final exam is individual exam.

*Late submission* including assignments, projects and exams will *not* be accepted.

## Grading

The grade of A is reserved for those who demonstrate extraordinary performance as determined by the instructor. The grade of A- is awarded only for excellent performance. The grades of B+ and B are awarded for good performance. The grades of B-, C+, C, and C- are awarded for adequate but substandard performance. The grades of D+, D, and D- are not awarded at the graduate level. The grade of F indicates the student’s failure to satisfactorily complete the course work. For Core/Foundation courses, the grade point average of the class should not exceed 3.35. For Elective courses, the grade point average should not exceed 3.45.

## Tentative Course Calendar

Instructors reserve the right to alter course content and/or adjust the pace to accommodate class progress. Students are responsible for keeping up with all adjustments to the course calendar.

| **Week** | **Topic** | **Readings** | **Due** |
| --- | --- | --- | --- |
| 1 | Introduction to Generative AI  Deep Learning and NLP Review | Foster(2023) Ch1-2 |  |
| 2 | Foundations of Text Generation  Generative AI Value Chain | Foster(2023) Ch3, 9  Wu and Matt (2023) | HW 1 release |
| 3 | Large Language Models and Strategies:  Prompt Engineering and “Reasoning” | HBC Case(2025) | HW 1 due  HW 2 release |
| 4 | Agentic AI and Business Cases  LLM Ethical Issues | Andrew Ng’s DeepLearning AI  <https://www.deeplearning.ai/the-batch/tag/letters/> | HW 2 due  Business case kickoff |
| 5 | LLM Applications in Business Domains: BloombergGPT and RAG | Wu et al. (2023)  Lewis et al. (2020) | HW 3 release |
| 6 | Foundations of Image Generation  Dark Side of Gen AI | Foster(2023) Ch4, 8, 13 | HW 3 due  HW 4 release |
| 7 | Responsible Gen AI and Looking Ahead  Student Business Case Presentation | Foster(2023) Ch14 | HW 4 due  Case report due |
| 8 | Final exam |  |  |

## Carey Business School Policies and General Information

Please note that failure to become acquainted with Carey policies will not excuse any student from adhering to these policies.

### Canvas Site

A Canvas course site is set up for this course. Each student is expected to check the site throughout the semester as Canvas will be the primary venue for outside classroom communications between the instructor and students. Students can access the course site at <https://canvas.jhu.edu/>.

### Technical Support

24/7 technical support for questions regarding Canvas, Zoom, and other technical issues is available. Please refer to Carey’s [Academic Resources webpage](https://carey.jhu.edu/student-experience/academic-resources) for contact information and other details.

### Students with Disabilities - Accommodations and Accessibility

Johns Hopkins University values diversity and inclusion. We are committed to providing welcoming, equitable, and accessible educational experiences for all students. Students with disabilities (including those with psychological conditions, medical conditions, and temporary disabilities) can request accommodations for this course by providing an Accommodation Letter issued by [Student Disability Services](https://carey.jhu.edu/student-experience/services-resources/student-disability-support-services). Please request accommodations for this course as early as possible to provide time for effective communication and arrangements. For further information or to start the process of requesting accommodations, please contact [Student Disability Services](mailto:carey.disability@jhu.edu) at the Carey Business School.

### Academic Ethics Policy

Carey expects graduates to be exemplary global citizens in addition to innovative business leaders. The Carey community believes that honesty, integrity, and community responsibility are qualities inherent in an exemplary citizen. The objective of the Academic Ethics Policy (AEP) is to create an environment of trust and respect among all members of the Carey academic community and hold Carey students accountable to the highest standards of academic integrity and excellence.

It is the responsibility of every Carey student, faculty member, and staff member to familiarize themselves with the AEP and its procedures. Failure to become acquainted with this information will not excuse any student, faculty, or staff member from the responsibility to abide by the AEP. Please contact the [Office of Student Affairs](mailto:carey.student@jhu.edu) if you have any questions. For the full policy, please visit the [Academic Ethics Policy webpage](https://carey.jhu.edu/student-experience/school-policies/academic-ethics-policy).

### Student Conduct Code

The fundamental purpose of the Johns Hopkins University’s regulation of student conduct is to promote and to protect the health, safety, welfare, property, and rights of all members of the University community as well as to promote the orderly operation of the University and to safeguard its property and facilities. Please contact the [Office of Student Affairs](mailto:carey.student@jhu.edu) if you have any questions regarding this policy. For the full policy, please visit the [Student Conduct Code webpage](https://studentaffairs.jhu.edu/policies-guidelines/student-code).

### Commitment to Respect

Respectful behavior creates an environment within the Carey Business School where all are valued and can be productive. Carey defines respectful behavior as conduct that, at a minimum, demonstrates consistent courtesy for others, including an effort to understand differences. As such, all in the community agree to the Carey Commitment to Respect, which states that we all strive to show that we value each other’s human dignity and our differences, and to choose behavior and language that demonstrates mutual respect. Please visit the [Commitment to Respect webpage](https://carey.jhu.edu/student-experience/school-policies/carey-business-school-community-commitment-respect) to learn more about the expectations and resources available.

### Classroom Policies for All On-Site and Remote-Live Classes

Carey is committed to maintaining the highest standards of excellence in all forms of instruction. To that end, we have developed [policies and procedures for all classes offered in on-site and remote-live formats](https://carey.jhu.edu/student-experience/school-policies/policies-procedures-on-site-remote-live-classes). These policies will govern all courses occurring in these formats, and all students are expected to familiarize themselves with and adhere to these policies.

### Student Success Center

The Student Success Center offers assistance in core writing and quantitative courses. For more information, visit the [Student Success Center webpage](https://carey.jhu.edu/student-experience/academic-support/student-success-center).

### Other Important Policies and Services

Students are encouraged to consult the [Student Handbook and Academic Catalog](https://carey.jhu.edu/student-experience/services-resources/student-handbook) and [Student Services and Resources](https://carey.jhu.edu/student-experience/services-resources) for information regarding other policies and services. For your convenience, there is a singular website students can visit to learn about all [JHU and Carey policies](https://carey.jhu.edu/student-experience/policies).

### Copyright Statement

Unless explicitly allowed by the instructor, course materials, class discussions, and examinations are created for and expected to be used by class participants only. The recording and rebroadcasting of such material, by any means, is forbidden. Violations are subject to sanctions under the [Academic Ethics Policy](https://carey.jhu.edu/student-experience/school-policies/academic-ethics-policy).