Tech-GB.3332: Introduction to AI and Its Applications in Business

Professor Alex Tuzhilin

Fall 2026

***** DRAFT SYLLABUS; SUBJECT TO CHANGE *****

Time: Wednesdays, 9 – 11:50 am
Office Hours: Wednesdays: 1 – 2:30 pm
and by appointment

Office: KMEC 8-87
Phone: 998-0832
e-mail: at2@stern.nyu.edu

Course Description

The field of Artificial Intelligence has experienced unprecedented growth over the last decade with major advances being made in Generative AI, Large Language Models (LLMs), Agentic AI, Physical AI, Computer Vision, Recommender Systems and across numerous applications of these and other related technologies. As a result, AI is fundamentally transforming various industries and labor markets, and this is only the beginning. According to a recent Goldman Sachs report, firms in customer support and software development report a median productivity boost of 30% from using AI. Also, around 6% of workers could ultimately be displaced from their jobs within the next decade (although the unemployment rate may rise only around 0.5% because many workers would transition into new roles). Finally, according to a McKinsey report, the gap between the organizations that adopt AI technologies in an effective and efficient manner allowing them to drive value across the organization and achieve operational efficiencies and sustainable growth while mitigating AI risks is widening vis-à-vis the laggards who are behind in this AI revolution, and this gap will continue to expand in the foreseeable future.

The purpose of this course is to provide the students with a comprehensive introduction to AI through the coverage of its four essential "pillars": (a) *foundations of AI:* what AI is and how it works; (b) *AI tools:* familiarity with practical AI systems and technologies that make them work; (c) *business applications* and how AI is used in business; (d) *societal and economic impact of AI*.

Upon completion of this course, the students will be able to:

1. Understand AI's fundamental concepts and methods
2. Learn how to apply AI-based methods to solving practical business problems
3. Acquire working knowledge of certain AI software
4. Understand how AI can transform businesses and affect the future of work

5. Understand the societal and economic impact of AI
6. Understand where AI technologies are heading within the next few years.

The students will acquire this knowledge through the combination of class lectures and discussions, case studies, assigned readings, in-class labs, and hands-on computing exercises and the term project. Periodically, experts from the industry will be invited to share their experiences with how AI technologies are used in their industries, how they apply AI to solve business problems faced by their organizations and also discuss current trends and future directions of AI technologies.

The students will also study how Artificial Intelligence is used in practical business settings by analyzing business cases. The cases studied this semester include:

1. "AI Wars in 2025", HBS case 9-725-484 written by A. Wu and A. Yang in August 2025.
2. "Salesforce Agentforce: the Limitless Workforce", HBS case 9-125-096 written by S. Srinivasan, A. Ciechanover and G. Gonzales in April 2025.
3. "JPMorganChase: Leadership in the Age of GenAI", HBS case 9-325-066 written by I. Bojinov, K. Lakhani and D. Lane in April 2025.
4. "Harvey: AI for Lawyers", HBS9-125-087, S. Srinivasan, C. Krumholz, R. Kak. March 2025

Textbook, Reading Materials and Software

Required book:

Generative AI for Business, by Wei Chen and Liwei Chen, GenAI Flows Publishing, 2025.

Additional (recommended, optional) books:

1. *Artificial Intelligence: A Modern Approach (4th edition).* Stuart Russell and Peter Norvig; Pearson, 2020 (the "bible" of AI – a time-honored AI classic).
2. *How AI Works: From Sorcery to Science.* Ronald Kneusel; No Starch Press, 2024.
3. *Deep Learning*: *A Visual Approach*. Andrew Glassner; No Starch Press, 2021.
4. *Generative AI with Python.* Bert Gollnick; Rheinwerk Computing, 2025.
5. *Generative AI with LangChain.* Ben Auffarth and Leonid Kuligin, Packt Publishing, 2025.
6. *AI Engineering: Building Applications with Foundation Models*. Chip Huyen; O'Reilly, 2025.
7. *Rebooting AI: Building Artificial Intelligence We Can Trust.* Gary Marcus and Ernest Davis; Pantheon Books, 2019.

Furthermore, additional reading materials will be posted periodically on Brightspace.

Software:

The software used in this class includes Gumloop or a similar tool (such as Make). However, if the students prefer doing their projects using other popular GenAI, agentic AI or DL-based systems and frameworks, such as n8n, Google's TensorFlow or Meta's PyTorch, this is also fine.

Prerequisites:

This course does not have any prerequisites. *However, having some prior technical, statistical and/or data science backgrounds is certainly a big plus*. Since we will use the no-code software in the class, *we will not do any coding in the class assignments and for the project*. Nevertheless, basic understanding of some elementary programming concepts will be useful for this course.

If you have limited technical, statistical or data science backgrounds, you can still take this class. However, *you will need to put significant extra effort in mastering certain technical materials* vis-a-vis those students who have more extensive technical backgrounds.

The Project:

There will be a group-based term project requiring you to implement an AI system using Gumloop or any other similar software. The purpose of this project is to help you acquire hands-on experiences with AI for solving business problems.

Assignments and Grading:

Besides the project described in the previous section, there will be four business cases studied in this class, and the students will be required to formally analyze *two cases* and submit their written reports. There will also be *two quizzes* and *four homework assignments* to test the knowledge of the covered materials. Note that the homeworks are *individual-based* assignments, unless *explicitly* stated otherwise. The purpose of the homeworks and quizzes is to encourage periodic review of the course materials and strengthening understanding of the concepts covered in class.

A student's overall score in the class will be calculated as the weighted average of the scores computed according to the following distribution:

Homework Assignments	32%
Case analysis (2 cases):	18%
Quizzes (2):	20%
Term Project:	20%
Class Participation:	10%

Class participation includes class attendance (including on-time arrival) and active class engagement.

At NYU Stern, we strive to create courses that challenge students intellectually and that meet the Stern standards of academic excellence. To ensure fairness and clarity of grading, the Stern faculty have agreed that for elective courses the individual instructor or department is responsible for determining reasonable grading guidelines.

Course Modules

The course will consist of several modules covering both business- and technology-oriented aspects of AI, and how they interact and affect each other. In particular, the course will cover the following general, technical and business-oriented topics in AI:

General Topics:

1. What AI is (and is not) and its capabilities; overview of its different areas and its history over the last 75 years
2. Examination of the state-of-the-art in AI; overview of the hard (vs. simple) AI problems and discussion of the Grand Challenges facing the field
3. Discussion of what is real and what is hype in AI and of the chasm between ambitions and realities of the current generation of AI systems
4. The ethical and trustworthy AI: how to build AI solutions that are fair, unbiased, transparent and reliable. Examination of the dangers and risks of AI systems and how to mitigate them.
5. Discussion of where the field is heading within the next several years and what it takes to develop the next generation of AI systems
6. Discussion of Artificial General Intelligence (AGI) and what it takes to reach this goal.

Technical Topics:

1. Overview of the basic principles of Deep Learning (DL). Introduction to the convolutional (CNN), recurrent (RNN) and other types of Deep Learning networks. Introduction to latent spaces and embeddings, transformers, diffusion models and other DL-based methods. Overview of how these methods are used in Computer Vision (CV), Natural Language Processing (NLP), machine translation, sentiment analysis and other applications.
2. Overview of Generative AI, LLMs and multimodal methods, the LLM foundation models, (including ChatGPT, Gemini and Claude), finetuning of these models and using RAGs. Overview of prompt engineering, hallucination, alignment, reasoning, bias, fairness & AI safety, and zero- vs. few-shot learning.
3. Overview of Agentic AI and of the principles and methods for designing robust and scalable agentic systems.
4. Going beyond Deep Learning and Generative AI: introduction to Heuristic Search, Reinforcement Learning, Recommender Systems, Logical (Symbolic) Reasoning, Knowledge Representation and Planning.
5. Introduction to the GenAI and Agentic tools, including Gumloop and Make, TensorFlow and PyTorch; overview of how to develop GenAI and Agentic AI solutions using such tools.
6. Overview of the AI infrastructure and discussion of scalability issues, including training AI models on massive datasets, and overview of specialized AI chips capabilities.

Business-Oriented Topics:

1. Discussions of how AI solutions can be used in organizations to transform their current business practices. AI capabilities and discussion of which business problems are more and which are less amenable to AI. Discussion of the risks of AI.

2. Discussion of how AI disrupts and transforms businesses and of the enabling nature of AI. Discussion of the future of work.
3. Agentic AI and automation of business processes; studies of what can be automated in modern AI-driven organizations and how.
4. Studies of how Artificial Intelligence is used in practical business settings by analyzing some business cases of deploying AI solutions in organizations across different industries.
5. Assessment of AI's impact on the world's economy and its social implications.

ACADEMIC INTEGRITY

We take pride in our well-rounded education and approach our academics with honesty and integrity. Indeed, integrity is critical to all that we do here at NYU Stern. As members of our community, all students agree to abide by the **NYU Academic Integrity Policies** as well as the NYU Stern Student Code of Conduct, which includes a commitment to:

- Exercise integrity in all aspects of one's academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by not engaging in any method or means that provides an unfair advantage.
- Clearly acknowledge the work and efforts of others when submitting written work as one's own. Ideas, data, direct quotations (which should be designated with quotation marks), paraphrasing, creative expression, or any other incorporation of the work of others should be fully referenced.
- Refrain from behaving in ways that knowingly support, assist, or in any way attempt to enable another person to engage in any violation of the Code of Conduct. Our support also includes reporting any observed violations of this Code of Conduct or other School and University policies that are deemed to adversely affect the NYU Stern community.
- **ChatGPT**: no ChatGPT or similar automated text-generating tools are allowed when producing case analysis reports.

STERN CODE OF CONDUCT

The Stern Code of Conduct and Judiciary Process applies to all students enrolled in Stern courses. Specific information can be found at https://www.stern.nyu.edu/uc/codeofconduct.

To help ensure the integrity of our learning community, prose assignments you submit to NYU Brightspace will be submitted to Turnitin. Turnitin will compare your submission to a database of prior submissions to Turnitin, current and archived Web pages, periodicals, journals, and publications. Additionally, your document will become part of the Turnitin database.

Students are also expected to maintain and abide by the highest standards of professional conduct and behavior. Please familiarize yourself with Stern's Policy in Regard to In-Class Behavior & Expectations for Graduate and Undergraduate students.

(https://www.stern.nyu.edu/portal-partners/registrar/policies-procedures/general-policies/code-conduct)
(http://www.stern.nyu.edu/portal-partners/current-students/undergraduate/resources-policies/academic-policies/index.htm) and the NYU Student Conduct Policy (https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-student-conduct-policy.html).

STUDENT ACCESSIBILITY

If you will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Student Accessibility (212-998-4980, mosescsa@nyu.edu) verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the Moses Center for Student Accessibility, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation. For more information, visit the CSA website: https://www.nyu.edu/students/communities-and-groups/student-accessibility.html

STUDENT WELLNESS

Our aim is for students to be as successful academically as they can, and to help them overcome any impediments to that. Any student who may be struggling and believes this may affect their performance in this course is urged to contact the Moses Center for Student Accessibility (see also the Student Accessibility section of this syllabus) at 212-998-4980 to discuss academic accommodations. If mental health assistance is needed, call the NYU's 24/7 Wellness Exchange hotline 212-443-9999. Furthermore, please approach me if you feel comfortable doing so. This will enable me to provide relevant resources or referrals. There are also drop in hours and appointments. Find out more at http://www.nyu.edu/students/health-and-wellness/counseling-services.html

Graduate students can also reach out to the Academic Advising team at academicaffairs@stern.nyu.edu if you would like to receive more information or further support.

NAME PRONUNCIATION AND PRONOUNS

NYU Stern students now have the ability to include their pronouns and name pronunciation in Albert. I encourage you to share your name pronunciation and preferred pronouns this way. Please utilize this link for additional information: Pronouns & Name Pronunciation

RELIGIOUS OBSERVANCES AND OTHER ABSENCES

NYU's Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious

obligations. You must notify me in advance of religious holidays or observances that might coincide with exams, assignments, or class times to schedule mutually acceptable alternatives. Students may also contact religiousaccommodations@nyu.edu for assistance.

NYU Stern is committed to ensuring an equitable educational experience for all students regardless of identity or circumstances and strives to recognize the obligations its students have outside of Stern. Please review all class dates at the start of the semester and review all course requirements to identify any foreseeable conflicts with exams, course assignments, projects, or other items required for participation and attendance. If you are aware of a potential conflict, please contact me as soon as possible to discuss any potential conflicts to determine whether/how they can be accommodated.

USE OF LAPTOPS, CELL PHONES & OTHER ELECTRONIC DEVICES

The use of electronic devices (e.g., laptops or cell phones) *are not permitted* in this class. Please, switch off the cell phones *before* entering the classroom. You *can* use a tablet *to take notes*, but please make sure *it lies flat – not upright – on the desk.*