Course Code: ECO4091

Course Name: Generative AI in Economic Analysis & Research

SYLLABUS[1]

Instructor **: Emin Köksal, Assoc. Prof.**
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CV (link) : https://eminkoksal.com/cv/

Course Information

Period : Spring
Time : Tuesday, 11.30 – 14.30
Course Credit / ECTS : 3/8
Classroom : Virtual Class
Mode of Delivery: : Synchronous/Asynchronous
Course type : Elective
Course ECTS Page Link : https://akts.bau.edu.tr/

Prerequisite

Although there is no official prerequisite for this course, students are expected to have completed introductory microeconomics and macroeconomics courses.

Course Objectives

This project-based learning course equips students with practical skills in applying Generative Artificial Intelligence (AI) to economic analysis and research. The course emphasizes hands-on experience, with students actively engaging in projects that mirror real-world applications of Generative AI in economics. The course uniquely features the use of Generative AI to assist students in learning and implementing Python API applications, providing a meta-learning experience that reinforces both Generative AI utilization and coding skills.

Course Learning Outcomes

At the end of the course, you will be able to:

1. Leverage web-based Generative AI interfaces for economic analysis and research tasks.
2. Develop Python scripts to interact with Generative AI APIs, with the unique approach of using Generative AI themselves to assist in the coding process.
3. Apply Generative AI to both microeconomic and macroeconomic research questions through guided projects.
4. Integrate Generative AI outputs with traditional economic models and methodologies.
5. Critically evaluate the strengths and limitations of Generative AI in economic contexts.
6. Conduct independent economic research projects utilizing Generative AI as a key analytical tool

[1]It is essential that the syllabus announced at the beginning of the term is not changed except when necessary. When a requirement occurs, the syllabus can be changed by the instructor of the course by notifying this situation in writing or verbally beforehand. It is students' responsibility to follow the current syllabus.

Contribution of the Course to the Program

Economics Program Outcomes	Level of Contribution
1. As a world citizen, she is aware of global economic, political, social and ecological developments and trends.	2
2. He/she is equipped to closely follow the technological progress required by global and local dynamics and to continue learning.	6
3. Absorbs basic economic principles and analysis methods and uses them to evaluate daily events.	4
4. Uses quantitative and statistical tools to identify economic problems, analyze them, and share their findings with relevant stakeholders.	4
5. Understands the decision-making stages of economic units under existing constraints and incentives, examines the interactions and possible future effects of these decisions.	3
6. Comprehends new ways of doing business using digital technologies. and new market structures.	6
7. Takes critical approach to economic and social problems and develops analytical solutions.	4
8. Has the necessary mathematical equipment to produce analytical solutions and use quantitative research methods.	5
9. In the works he/she contributes, observes individual and social welfare together and with an ethical perspective.	3
10. Deals with economic problems with an interdisciplinary approach and seeks solutions by making use of different disciplines.	4
11. Generates original and innovative ideas in the works she/he contributes as part of a team.	4

Course Structure

Our course will be carried out on the online platform over the virtual classroom. Students are expected to follow the classes from the virtual classroom during the course hours.

Teaching Methods and Techniques Used in the Course

☑ Case Study
☐ Drama
☐ Fieldwork
☐ Internship
☑ Project
☑ Technology-Enhanced Learning
☐ Collaborative Learning
☐ Educational Game
☐ Guest Speaker
☑ Lecture
☐ Reading
☐ Other
☐ Differentiation
☐ Experiment
☑ Implementation
☐ Observation
☑ Simulation
☑ Discussion
☐ Field Trip
☐ Individual Study
☑ Problem Solving
☐ Social Activity

Course Policies

Communication Channels and Methods: For your questions about the course please use *ItsLearning* messaging tool.

Usage of Digital Tools: Digital tools can only be used for learning purposes during the classes.

Assignments Deadline: All your assignments will be submitted via *ItsLearning*. Assignments sent after the deadline (via e-mail) will not be accepted.

Attendance: There is no mandatory attendance for this course. But remember that you are responsible from class discussions.

Disabled Student Support: You can contact me directly regarding the issues that may be an obstacle for you (vision, hearing, etc.). In addition to this, there is a Disabled Student Unit to minimize the difficulties that our disabled students will encounter due to their disabilities and to eliminate the obstacles.

Privacy and Copyright: The courses will be recorded on the online platform within the scope of your approval and knowledge.

Course Resources

The materials for the class that correspond closely to the lectures are

- Phoenix, J., & Taylor, M. (2024). *Prompt Engineering for Generative AI*. O'Reilly Media. (Google Books)
- Korinek, A. (2024). *Generative AI for Economic Research: LLMs Learn to Collaborate and Reason* (No. w33198; p. w33198). National Bureau of Economic Research

The following books are recommended as supplementary materials:

- Suleyman, M., & Bhaskar, M. (2023). The Coming Wave: Technology, Power, and the Twenty-first Century's Greatest Dilemma. Penguin Random House.
- Khan, S. (2023). Brave New Words: How AI Will Revolutionize Education (and Why That's a Good Thing). Twelve.
- Agrawal, A., Gans, J., & Goldfarb, A. (2022). Power and Prediction: The Disruptive Economics of Artificial Intelligence. Harvard Business Review Press.

Below cited links may be helpful to stay informed about current developments:

- DeepLearning AI Short Courses
- AI Foundations
- Andy Stapleton
- Sam Witteveen
- Matthew Berman
- Skill Leap AI

Other required readings will be uploaded to *ItsLearning*. If you cannot access any material, please contact me immediately.

Grading and Evaluation

The following grading system will be applied for this course.

Assignment	Description	Scoring	Weight (%)
Weekly Assignments	The course includes 10 weekly assignments, each contributing 6% to the final grade. These assignments are designed to provide hands-on experience with generative AI tools in economic research and analysis. Students are required to submit their assignments weekly via *ItsLearning* before the next class session.	60	60

Project	The project will require students to apply AI tools to an independent economic research topic. They will integrate AI-powered data analysis, forecasting, modeling, and research writing to produce an original research paper. The project should be completed through the following five steps: 1. Topic Selection & Proposal (5%) – Submit a short proposal outlining the research question and AI tools to be used. (Deadline: Week 8) 2. Detailed Outline (5%) – Provide a detailed outline of the project. (Deadline: Week 9) 3. Slot Reservation – Reserve a slot for project presentation. (Deadline: Week 10) 4. Project Presentation & Peer Review (15%) – Present findings in class, followed by peer feedback. (Deadline: Week 11-14) 5. Project Submission & Evaluation (15%) – Submit the research paper for final evaluation. (Deadline: Week 14)	40	40
TOTAL		100	100

Course Calendar

Week / Place	Course Topic	To Do	Assignments & Deadline*
W1 Online	Introduction to Generative AI and Its Economic Impact	Create accounts on ChatGPT, Claude, and Google Gemini (at least free versions)	Compare responses from different LLM platforms on a basic economic query
W2 Online	Fundamentals of LLM Interaction and Prompt Engineering	Complete one conversation with any LLM about an economic topic	Design effective prompts for different economic analysis tasks
W3 Online	Generative AI Models, Workspaces and Customization	Try different models, workspaces and custom tools	Complete a research task creating a custom tool and using a workspace
W4 Online	Advanced Issues: Reasoning Models, Prompt Generators and Agentic Workflow	Try different reasoning models and prompt generators	Complete a mini project on one of those issues that reflects its effectiveness
W5 Online	Python Fundamentals with AI Assistance	Create account for Google Colab	Program exercises with AI assistance
W6 Online	AI APIs and Advanced Integration	Get an API Key from Gemini	Create a program that integrates with AI APIs
W7 Online	Applications in Microeconomic Analysis	Collect a simple market dataset	Conduct a market analysis project
W8 Online	Macroeconomic Analysis with AI	Collect a simple macroeconomic dataset	Generate economic forecasts using AI tools **Submit project proposal!**
W9 Online	Research Methods and AI	Prepare research questions	Begin research project with AI assistance **Reserve a slot for the presentation!**
W10 Online	AI for Research Promotion	Draft initial research summary	Create research presentation **Submit detailed outline of the project!**
W11 Online	Project Presentations	Prepare your project presentation	
W12 Online	Project Presentations	Prepare your project presentation	
W13 Online	Project Presentations	Prepare your project presentation	
W14 Online	Project Presentations	Prepare your project presentation	**Submit the research paper!**

Matters Needing Attention

- Make sure you do all weekly to dos before coming to class.
- Participate positively in classroom activities and discussions.

- Attend the classes actively every week.

Academic Integrity, Cheating and Plagiarism

ARTICLE 25 – (1) In case it is doubled that a student cheats or attempts to cheat, commits plagiarism or similar violations defined in the applicable disciplinary regulation in any exam, assignment or other assessment activities, a disciplinary proceeding is brought against the student. Such activity is not assessed during the proceedings. A student who is found guilty is assigned zero point in addition to the disciplinary punishment. If the student is found innocent because of disciplinary proceeding, the exam taken by the student shall be assessment or a make-up exam or activity is provided.

You can access Bahçeşehir University and Higher Education Institution Regulations by clicking this sentence.

Prepared by:

EMİN KÖKSAL

05.02.2025