Artificial Intelligence (AI): Applications in Economics and Public Policy

Jindal School Of Government and Public Policy

School Elective

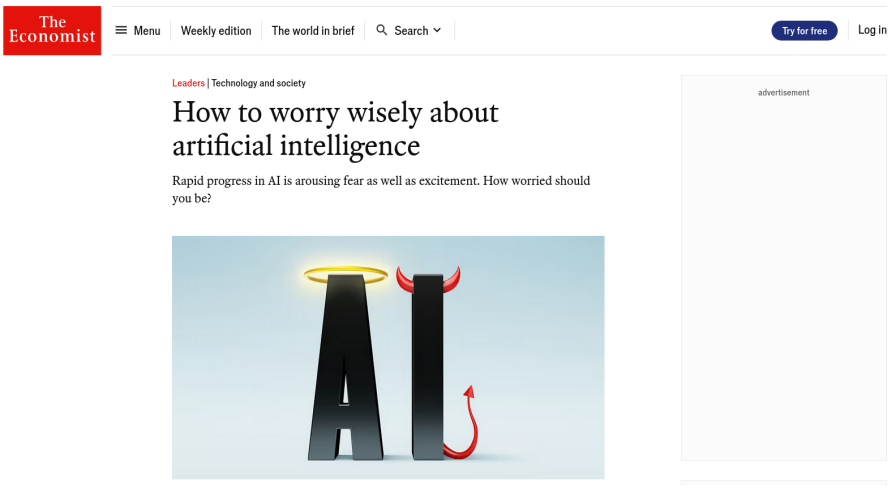
Spring 2026

1 Course Description

AI has made its way to regular things in life especially with respect to the privacy and data sharing concerns that we have. We have internalized more surveillance and that has resulted in changes in human behaviour. Moreover, economists and public policy enthusiasts are trying to understand the impact of AI on employment, growth, health, education, banking and other fields. This course makes an attempt to understand the buzz words around AI such as OPEN AI, Generative AI, Large Language Models (LLM), Machine Learning, Deep Learning, ChatGPT and understand their applications into different areas of economics and public policy.

This course introduces the fundamentals of Artificial Intelligence (AI) and its transformative impact on economics and public policy. Students will explore key AI concepts, methodologies, and applications relevant to economic analysis and policy-making. In the first part of the course, students will learn selected techniques of supervised and unsupervised learning.

The course emphasizes the ethical, societal, and economic implications of AI, preparing students to critically assess and leverage AI technologies in public decision-making. The course involves decoding the meaning of various terms related to AI, a live project on applications in Economics and Public Policy using machine learning and other techniques, and the course ends with a discussion on how Artificial Intelligence is related to Karl Marx's labour theory of value, the rise of digital capitalism, the implications of AI on inequality, and the future of work from a political economy framework.



2 Instructor

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Dr. Prachi Bansal holds a Ph.D from Jawaharlal Nehru University, New Delhi and is also a WID.world Fellow at the World Inequality Lab, Paris School of Economics. Her research areas include agriculture, inequality, labour, and technology. Her work examines how structural changes in the economy from agricultural transformation to the rise of artificial intelligence shape patterns of work, care, and welfare. Her research spans themes such as labour absorption in Indian agriculture, inflation inequality, agrarian change, and the impact of AI on care and service work. She has collaborated with international organizations including the Food and Agriculture Organization (FAO) and the International Labour Organization (ILO) on projects concerning data anonymization, debt-bondage, and SDG indicators on labour and food security.

3 Prerequisites:

- Course Requirements: Introductory courses in economics, linear algebra, programming in Python (basic). Advance courses on statistics and econometrics. **This course is best suited for students with a strong foundation in mathematics and statistics who wish to deepen their understanding of machine learning techniques and their applications in economics and public policy.**
- Programming Skills: Familiarity with basic programming in Python is **mandatory**.
- Software Requirements: This course will use Python, ensuring accessibility without the need for paid software.
- Hardware Requirements: A functioning laptop

4 Course Structure:

The course is divided into 2 equal parts.

Part 1: we shall discuss the concepts around AI: what is it? What is large language models? What is Generative AI and OpenGPTs. We shall learn machine learning techniques and apply them in the area of Economics and Public Policy. (Module 1 to 4)

Part 2 of the course shall deep dive into AI ethics, governance, issues of surveillance, and the application of AI in economics and public policy. (Module 5 to 7)

4.1 Part 1 (Week 1 to 10)

- **Module 1: Introduction to Artificial Intelligence (AI)** (Week 1 and 2)
  - Overview of AI: Definition, history, and key concepts.
  - AI vs. Machine Learning vs. Data Science: Distinctions and overlaps.
  - AI in the Context of Economics and Public Policy: Potential and limitations.
  - Tools and Software: Introduction to R/Python for AI applications.
- **Module 2: Machine Learning using Python/R** (Week 3 to 6)

- **Supervised vs. Unsupervised Learning**: Core algorithms and use cases.
- Supervised Learning: Logistic regression, linear regression, and decision trees are part of this, but an introduction to more advanced models like random forests, gradient boosting (e.g., XGBoost, LightGBM), and support vector machines is also a part of this module.
- Regression and Classification: Techniques relevant to economic modeling.
- Data Preparation and Feature Engineering: Key steps in the AI pipeline.

Unsupervised Learning: Introduce techniques like clustering (k-means) and principal component analysis (PCA), which are crucial for exploring patterns in data without predefined labels Using Transformer Models such as Hugging Face (Optional. We may or may not cover).

Hands-On Lab: Implementing basic machine learning models in R/Python. Project: A complete project based on Machine Learning

- **Module 3: AI Applications in Economics, Finance, and Public Policy** (Week 6-10)
  - Predictive Analytics and AI in banking and Finance: Using AI to predict economic trends, applications in credit and fraud risk. Case Studies: Real-world examples of AI applications in
  - AI for Policy Analysis: Simulation, optimization, and decision support systems.
  - AI and Public Services: Use in healthcare, education, and welfare programs.

4.2 Part: 2 (Week 11 to 15)

- **Module 4: AI Issues, Concerns and Ethical Considerations**
  - Defining AI Ethics
  - Understanding Bias and AI
  - AI Ethics and Governance: Global perspectives on regulating AI technologies.
  - Privacy, Surveillance, and AI: How people have internalized surveillance. How should we address it?
- **Module 5: AI and the Future of Work**
  - Automation and Labor Markets: How AI is reshaping employment and skills.
  - AI in Job Creation and Destruction: Sectors most impacted.
  - Policy Responses to AI-Induced Changes: Education, retraining, and social safety nets.
  - Debates and Discussions: Preparing for the future of work in an AI-driven economy.
  - Discussion on Chapter 15, Capital, Volume-1, Karl Marx.
- **Module 6: AI and Economic Inequality**
  - AIs Impact on Wealth Distribution: Who benefits and who doesnt?
  - Policy Interventions: Ensuring inclusive growth in an AI-driven world.
  - Case Studies: Examining AI's role in exacerbating or reducing inequality.
  - Digital Capitalism
  - AI in Developing Countries: Opportunities and challenges.
  - Debates and Discussions: Crafting AI policy for economic development.

4.3 Expected Learning Outcomes:

By the end of the course, students will:

- Have a strong foundational understanding of AI principles.
- Be able to apply AI tools to economic and policy analysis.
- Critically evaluate the ethical and societal implications of AI.
- Develop informed perspectives on the future of work and economic inequality in the context of AI.

4.4 Readings (Tentative)

Please note that this area is relatively new. This list will be amended as we go forward.

1. Andrew Ng - "Machine Learning Yearning": This is a free book by Andrew Ng that provides practical advice on how to structure machine learning projects, touching on supervised and unsupervised learning. Link: `https://nessie.ilab.sztaki.hu/~kornai/2020/AdvancedMachineLearning/Ng_MachineLearningYearning.pdf`
2. James, G., Witten, D., Hastie, T., Tibshirani, R. - "An Introduction to Statistical Learning": Chapter 2,3, and 4. Python and R versions available here: `https://www.statlearning.com/`
3. NITI Aayog - "National Strategy for Artificial Intelligence" (2018): This policy paper outlines the AI strategy of India, focusing on sectors such as agriculture, healthcare, education, and governance. `https://www.niti.gov.in/sites/default/files/2023-03/National-Strategy-for-Artificial-Intelligence.pdf`
4. Ryan, M., Isakhanyan, G., & Tekinerdogan, B. (2023). An interdisciplinary approach to artificial intelligence in agriculture. NJAS: Impact in Agricultural and Life Sciences, 95(1). `https://doi.org/10.1080/27685241.2023.2168568`
5. Büthe, T., Djeffal, C., Lütge, C., Maasen, S., & Ingersleben-Seip, N. von. (2022). Governing AI attempting to herd cats? Introduction to the special issue on the Governance of Artificial Intelligence. Journal of European Public Policy, 29(11), 17211752. `https://doi.org/10.1080/13501763.2022.2126515`
6. Russell, S., & Norvig, P. - "Artificial Intelligence: A Modern Approach": A comprehensive guide on AI fundamentals, useful for more in-depth exploration of AI methods and their applications.
7. Mollick, Ethan, and Ethan Mollick. Co-Intelligence. Random House UK, 2024.
8. Ernst, Ekkehardt, Rossana Merola, and Daniel Samaan. "Economics of artificial intelligence: Implications for the future of work." IZA Journal of Labor Policy 9.1 (2019).
9. Acemoglu, Daron, and Pascual Restrepo. "Artificial intelligence, automation, and work." The economics of artificial intelligence: An agenda. University of Chicago Press, 2018. 197-236.
10. Acemoglu, Daron, and Pascual Restrepo. "The wrong kind of AI? Artificial intelligence and the future of labour demand." Cambridge Journal of Regions, Economy and Society 13.1 (2020): 25-35.
11. Generative AI and Jobs: A global analysis of potential effects on job quantity and quality, ILO Working paper 96, `https://www.ilo.org/publications/generative-ai-and-jobs-global-analysis-potential-effects-job-quantity-and`

12. Recording: Can we have pro-worker AI? https://live.ilo.org/events/can-we-have-pro-worker-ai-2024-06-19

13. Ethics of Artificial Intelligence: https://www.unesco.org/en/artificial-intelligence/recommendation-ethics

14. Hagendorff, T. The Ethics of AI Ethics: An Evaluation of Guidelines. Minds & Machines 30, 99120 (2020). https://doi.org/10.1007/s11023-020-09517-8

15. Marx, Karl. Capital volume 1, Chapter 15.

16. Digital Capitalism, Networking the Global Market System by Daniel Schiller, MIT Press https://mitpress.mit.edu/9780262692335/digital-capitalism/

17. Zuboff, Shoshana. "The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power, edn." PublicAffairs, New York (2019).

18. Betancourt, Michael. The critique of digital capitalism: An analysis of the political economy of digital culture and technology. punctum books, 2015.

19. Bansal, Prachi, "AI is sexist. Heres how" https://indianexpress.com/article/opinion/columns/ai-is-sexist-workforce-gender-wage-gap-data-feminism-9380584/

20. ILO (2024), Mind the AI Divide: Shaping a Global Perspective on the Future of Work. Read here: https://www.ilo.org/sites/default/files/2024-08/Mind%20the%20AI%20Divide_v12%20%281%29.pdf

21. ILO (2025), Generative AI and jobs: A 2025 update, https://www.ilo.org/publications/generative-ai-and-jobs-2025-update

22. Resource: https://www.ilo.org/artificial-intelligence-and-work-digital-economy

4.5 Assessment

Internal Assessment: Written Exams, Presentations and Quizzes (40 percent grade) & Group Project (30 percent)
External Assessment: Final Exam (30 percent grade)