

ECON 490: TECHNOLOGY, GROWTH, AND THE FUTURE OF WORK

Spring 2026

Instructor: Jingnan Liu
Email: jingnan@illinois.edu

Time: Monday & Wednesday 3:30 – 4:50 PM
Place: 123 David Kinley Hall

Course Pages: The course syllabus, lecture slides, supplementary materials, and homework assignments and answers will be posted on [Canvas](#). Homework assignments are submitted through Canvas.

Course Trailer: Watch the [trailer](#) to see what we will be exploring this semester!

Office Hours: Mondays 4:50 - 5:50 PM, 123 David Kinley Hall

Grader: Sunny Liu (xliu138@illinois.edu)

Overview: This course examines the role of technology in driving economic growth and shaping the future of work. We begin by exploring why some countries grow faster than others, how innovation and ideas fuel productivity, and how new technologies diffuse across firms and borders. We then turn to the labor market, asking how automation, artificial intelligence (AI), and related technologies impact jobs, skills, and wages. Throughout the semester, we connect theory, data, and policy to help students critically assess how technology creates opportunities and challenges for economies.

Prerequisites: This course is primarily designed for upper-level undergraduate students interested in technology, economic growth, and the labor market. In line with the economics department policy, students are required to have completed *Economic Statistics* (ECON 202), and either *Intermediate Microeconomics* (ECON 302) or *Intermediate Macroeconomics* (ECON 303), as well as *Calculus* (MATH 220, MATH 221, or an equivalent course). Familiarity with basic econometric concepts and experience using statistical software (such as Python, R, or Stata) are strongly recommended.

Evaluation: Course grades will be on a +/- letter scale and will be determined as follows:

- **Homework (5% × 2 = 10%)**

- There are two homework assignments, each worth 5% of the course grade.
- Homework assignments will be posted on Canvas and are due at 11:59 pm on February 11, March 23.
- ***All homework must be submitted through Canvas by the posted deadline.*** The Canvas deadline is binding. Students are strongly encouraged to submit well ahead of the deadline to avoid potential technical or Internet-related issues.
- ***Late submissions will not be accepted*** and will receive a grade of 0, except as required by university policy or approved accommodations.
- Homework will be graded on a scale of 1–5, reflecting both the correctness of answers and the clarity of exposition.
- Submissions must be in Word or PDF format. If a homework includes handwritten components, these must be clearly scanned and submitted as part of a single, legible document.
- It is the student's responsibility to ensure that submitted files are complete, readable, and accessible. Files that cannot be opened, are corrupted, or password-protected will be treated as missing submissions and will receive a grade of 0.

- Students may work in small groups on homework assignments; however, each student must write and submit their own solutions.

- **Midterm Exams (30% × 2 = 60%)**

- There are two midterm exams, each worth 30% of the course grade.
- Exams will take place during regular class hours (3:30–4:50 pm) on **February 18** and **March 30**.
- Both exams will be held in **Armory 101** (not the regular classroom). The exams will be in-person and closed-book.
- Exam dates are fixed and cannot be rescheduled. No make-up exams will be offered.
- Calculators are permitted. However, calculators with Internet access or communication capabilities (e.g., TI-Nspire models) are not allowed.

- **Final Project (25%)**

- There is no final exam for this course. Instead, students will complete a final project, in teams of up to three students.
- The final project provides an opportunity to explore a topic of your choice related to technology and its economic impact. You will select a technology and analyze its impact on one or more aspects of the economy, such as growth, production, work, inequality, consumer behavior, innovation, competition, regulation, health, education, or international trade.
- Project expectations and evaluation:
 - * A successful project clearly states a research question and its economic motivation; demonstrates engagement with economic ideas by applying theory, data, or existing literature appropriately; presents a clear and coherent analysis (ranging from a careful synthesis of existing work to original economic analysis); and properly cites all data sources and references.
 - * Projects that demonstrate original analysis and high overall quality may receive higher evaluations. Original analysis may include independently sourced data, original empirical analysis, or a clearly developed economic model. Quality refers to the clarity and focus of the research question, coherence of the economic reasoning, appropriate use of analytical tools, and clear interpretation of results.
- During the last two weeks of the semester (April 27–May 6), each team will deliver a 10-minute in-class presentation, followed by a 5-minute Q&A. Presentations should summarize the research question, approach, and main findings. During the Q&A, students will be asked questions based on their presentation to assess their understanding of the research topic, the analysis they conducted, and how they interpret and justify their conclusions. Time limits will be strictly enforced. Presentation slides must be submitted on Canvas by noon on the day of the presentation.
- A written final report must be submitted on Canvas by May 10. The report should clearly state the research question, summarize relevant theory and data evidence, and present the analysis and conclusions. Revisions after the presentation will not be required.
- The presentation, Q&A, and written report will be evaluated together as a single final project grade, with emphasis on the overall quality and coherence of the project.
- For team projects, all team members will receive the same final project grade. Teams are expected to contribute and collaborate in a fair and equitable manner. Each member of the team should be prepared to participate in the presentation and the Q&A.

- **Class Participation (5%)**

- This portion of the grade is based on regular attendance and constructive participation in class activities. Students are encouraged to participate by asking questions, contributing to discussions, sharing perspectives, and respectfully engaging with others' ideas.
- Attendance during classmates' final project presentations is expected and will be taken into account as part of the class participation grade.

Grading Policy: All grades will be posted on Canvas. If you believe there's been an error, you may request a re-grade within **7 calendar days** of the grade being posted. After that window, re-grade requests will no longer be considered. All re-grade requests must be submitted in writing and through the appropriate channels:

- **Homework and midterm exams**

Please **contact the grader by email** ([Sunny Liu, xliu138@illinois.edu](mailto:xliu138@illinois.edu)) with a clear description of the perceived error and a concise explanation of why you believe the work should be graded differently. When a regrade request is submitted, the *entire* assignment or exam will be regraded, not just the specific question identified. As a result, the final score may increase, decrease, or remain unchanged.

- **Final exam**

Due to timing constraints associated with final grade submission, regrade requests for the final project cannot be accommodated. However, the instructor will review final course grades to ensure that they are not sensitive to small, mechanical changes in the final exam score.

Deadlines, Exams, and Presentations Policy: Assignment deadlines, exam dates, and presentation dates are fixed and are not flexible. Exceptions will be considered only in cases of documented, serious circumstances, including:

1. documented medical emergencies, supported by a formal letter from a healthcare provider; or
2. the death or serious illness of an immediate family member, supported by appropriate documentation.

Students who anticipate a potential conflict must notify the instructor as soon as possible, and no later than **12:00 pm (noon) on the day before** the relevant deadline or exam, in order to discuss possible arrangements. Any request for an exception must be supported by verifiable documentation. If no qualifying emergency can be verified, standard grading and deadline policies will apply. For additional details, please refer to the University of Illinois Student Code: [Article 1 — Student Rights and Responsibilities](#).

Course Communication: To keep communication effective and beneficial for everyone, please use the following channels depending on the nature of your question:

- **In-class questions.** Many questions that arise outside of class would benefit the entire class. If you have a relatively straightforward question (for example, clarifying an assignment or course logistics), please consider raising it during class so that everyone can benefit.
- **Office hours.** If you have more involved questions or individual concerns, office hours are the best place to discuss them. You are welcome to attend my office hours on Monday from 4:50 pm to 5:50 pm in 123 David Kinley Hall.
- **Email.** Email is best reserved for special circumstances or brief, personal matters that cannot be easily addressed during class or office hours. While I read all emails, I cannot guarantee a prompt response, particularly during busy periods.

AI Policy: You are allowed to use tools like ChatGPT, Claude, Gemini, and other AI tools. We recognize that these tools are becoming increasingly valuable, and learning to use them effectively is important. However, relying too heavily on AI can cheat you of your own learning. You are paying large costs, both financially and in terms of opportunity costs, to learn at Illinois.

If you use AI for any component of this course (including homework, presentation, or final report), you must include a brief AI Usage Disclosure at the end of your work. This should briefly describe which tool you used and how you used it. For example:

- *I used ChatGPT to brainstorm the economic intuition behind diminishing marginal product when I got stuck.*
- *I used Gemini to help me set up the maximization problem for the Golden Rule consumption level and to double-check my first-order conditions.*
- *Claude helped me draft the first version, which I then revised and expanded.*

This disclosure will **not** negatively impact your grade. It simply fosters a culture of academic transparency and helps me understand how these tools are supporting your learning process.

Course Schedule

Date	Topic and Readings	Assignment
Jan 21	Why Technology Matters: Growth, Labor, and Big Questions	
Jan 26	Why are Some Countries Richer than Others?	
Jan 28	Why Do Economies Grow?	
Feb 2	Accounting for Growth	Homework 1 Posted
Feb 4	The Economics of Ideas	
Feb 9	Innovation and Economic Growth	
Feb 11	Are Ideas Getting Harder to Find?	Homework 1 Due
Feb 16	Exam Review	
Feb 18	Midterm Exam	
Feb 23	Exam Debrief and A Guide to Final Project	
Feb 25	Creative Destruction and Schumpeterian Growth	
Mar 2	How Destructive Is Innovation?	
Mar 4	What Happened to U.S. Business Dynamism?	
Mar 9	Why Do Firms (Not) Adopt New Technologies?	Homework 2 Posted
Mar 11	How Do Technologies Diffuse?	
Mar 16	Spring Break – No Class	
Mar 18	Spring Break – No Class	
Mar 23	Is There Enough Innovation?	Homework 2 Due
Mar 25	Exam Review	
Mar 30	Midterm Exam	
Apr 1	Exam Debrief and Final Project Planning Workshop	
Apr 6	Uneven Growth and Wage Inequality	
Apr 8	Does Automation Replace Skills or Tasks?	
Apr 13	Task-Based Framework and Automation	
Apr 15	Is Technology Creating New Tasks or Just Replacing Old Ones?	
Apr 20	The Direction of Technological Change	
Apr 22	What Will the AI Future Look Like?	
Apr 27	Student Presentations of Final Project	
Apr 29	Student Presentations of Final Project	
May 4	Student Presentations of Final Project	
May 6	Student Presentations of Final Project	
May 10		Final Report Due

Reading Material: The course does not have a main textbook. It draws on a collection of academic papers, online articles, and selected book chapters. Each class will have several recommended readings. In addition to these readings, we will also recommend videos and podcasts to enhance your learning experience and offer alternative perspectives on the material.

Lectures and Readings

(listed in order of importance)

January 21: Why Technology Matters: Growth, Labor, and Big Questions

- De Long, B. *Berkeley Faculty Lunch Talk: Main Themes of Twentieth Century Economic History*.
- Romer, P. *Economic Growth*. In *The Concise Encyclopedia of Economics*. <https://www.econlib.org/library/Enc/EconomicGrowth.html>
- Pritchett, L. (2022). *Economic growth is enough and only economic growth is enough*. Oxford Blavatnik School of Government and London School of Economics (with A. Lewis)
- Pritchett, L. (1997). *Divergence, Big Time*. *Journal of Economic Perspectives* 11(3).
- Pritchett, L. (2022). *Development Happened. Did Aid Help?* Oxford Blavatnik School of Government and LSE, Mar 10.

January 26: Why are Some Countries Richer than Others?

- Charles I. Jones, *Introduction to Economic Growth*, Chapter 4.
- Amartya Sen, “Quality of Life: India vs. China.” *New York Review of Books*, May 12, 2011.

January 28: Why Do Economies Grow? Inputs?

- Charles I. Jones, *Introduction to Economic Growth*, Chapter 5.
- “No Need to Dig.” *The Economist*, November 2, 2013.

February 2: Accounting for Growth

- Charles I. Jones, *Introduction to Economic Growth*, Chapter 6 (Section 5 only).
- Paul Krugman, “The Myth of Asia’s Miracle.” *Foreign Affairs*, Nov/Dec 1994.
- Paul Romer, “For Richer, For Poorer.” *Prospect*, January 27, 2010.
- Thomas Friedman, “Why Nations Fail.” *New York Times*, March 31, 2012.

February 4: The Economics of Ideas

- Charles I. Jones, *Introduction to Economic Growth*, Chapter 6 (Sections 1 and 2).
- Paul Romer, “Economic Growth.” In *The Concise Encyclopedia of Economics*, ed. David R. Henderson. Liberty Fund, 2007.
- “Should Consumers Be Able to Sell Their Own Personal Data?” *Wall Street Journal*, October 13, 2019.

- “Ten Facts about the Economics of Climate Change and Climate Policy.” The Hamilton Project and the Stanford Institute for Economic Policy Research, October 2019.

February 9: Innovation and Economic Growth

- Charles I. Jones, *Introduction to Economic Growth*, Chapter 6 (Sections 3 through 8).
- Eduardo Porter, “America’s Best Days May Be Behind It.” *New York Times*, January 19, 2016.
- Steve Lohr, “Economists Pin More Blame on Tech for Rising Inequality.” *New York Times*, January 11, 2022.
- Innoscape Talk with Paul Romer (Nobel Prize in Economics 2018): <https://www.youtube.com/watch?v=zyMa2y9dzBo>

February 11: Are Ideas Getting Harder to Find?

- Bloom, Nicholas, Charles I. Jones, John Van Reenen, and Michael Webb (2020), “Are Ideas Getting Harder to Find?” *American Economic Review* 110, April: 1104–1144.

February 25: Creative Destruction and Schumpeterian Growth

- 2025 prize lectures in economic sciences: https://www.youtube.com/watch?v=jQCkCcuSJ_U
- Lecture of Philippe Aghion: https://www.youtube.com/watch?v=D3_RD8DhqF4&t=922s

March 2: How Destructive Is Innovation?

- Garcia-Macia, Daniel, Chang-Tai Hsieh and Peter J. Klenow (2019), “How Destructive is Innovation?” *Econometrica* 87, September: 1507–1541.
- Aghion, Bergeaud, Boppart, Klenow and Li (2019), “Missing Growth from Creative Destruction.” *American Economic Review*.

March 4: What Happened to U.S. Business Dynamism?

- Akcigit, Ufuk and Sina Ates (2019), “What Happened to U.S. Business Dynamism?” *Journal of Political Economy*, forthcoming.

March 9: Why Do Firms (Not) Adopt New Technologies?

- TBA

March 11: How Do Technologies Diffuse?

- Francisco J. Buera and Robert E. Lucas, Jr. (2018), “Idea Flows and Economic Growth.” *Annual Review of Economics*, Vol. 10: 315–345.

March 23: Is There Enough Innovation?

- TBA

April 6: Uneven Growth and Wage Inequality

- Moll, Benjamin, Lukasz Rachel, and Pascual Restrepo (2022), “Uneven Growth: Automation’s Impact on Income and Wealth Inequality.” *Econometrica* 90, November: 2645–2683.

April 8: Does Automation Replace Skills or Tasks?

- Acemoglu, Daron, and David Autor (2012). “What Does Human Capital Do? A Review of Goldin and Katz’s The Race between Education and Technology.” *Journal of Economic Literature* 50(2): 426–463.
- Autor, David H., Frank Levy, and Richard J. Murnane. “The Skill Content of Recent Technological Change: An Empirical Exploration.” *Quarterly Journal of Economics* 118(4): 1279–1333.

April 13: Task-Based Framework and Automation

- Acemoglu, Daron and Pascual Restrepo (2022). “Tasks, Automation, and the Rise in US Wage Inequality.” *Econometrica* 90, September: 1973–2016.

April 15: Is Technology Creating New Tasks or Just Replacing Old Ones?

- Acemoglu, Daron, and Pascual Restrepo (2019). “Automation and New Tasks: How Technology Displaces and Reinstates Labor.” *Journal of Economic Perspectives* 33(2): 3–30.
- Autor, David H. (2015). “Why Are There Still So Many Jobs? The History and Future of Workplace Automation.” *Journal of Economic Perspectives* 29(3): 3–30.
- TED Talk: <https://www.youtube.com/watch?v=LCxcnUrokJo>

April 20: The Direction of Technological Change

- TBA

April 22: What Will the AI Future Look Like?

- TBA

Miscellaneous

Academic Assistance: Students are encouraged to utilize the many resources we have throughout campus to assist with academics and visit the [Connie Frank CARE Center](#). We recommend that you seek them out starting early in the semester, not just in times of academic need, in order to develop good study habits and submit work which represents your full academic potential. Many resources are found on the Economics Website including details about the Economics Tutoring Center, Academic Advising, and other academic support options: <https://economics.illinois.edu/academics/undergraduate-program/academic-student-support>

Academic Integrity: According to the Student Code, “It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions.” Please know that it is my responsibility as an instructor to uphold the academic integrity policy of the University, which can be found here: <https://studentcode.illinois.edu/article1/part4>

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policies. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity. Read the full Student Code at <https://studentcode.illinois.edu/>

Students with Disabilities: To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu. DRES Website: <https://dres.illinois.edu/>

Connie Frank CARE Center /Community of Care: As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the [Connie Frank CARE Center](#) (217-333-0050 or <http://odos.illinois.edu/community-of-care/referral/>). Based on your report, the staff in the Connie Frank CARE Center reaches out to students to make sure they have the support they need to be healthy and safe. Further, we understand the impact that struggles with mental health can have on your experience at Illinois. Significant stress, strained relationships, anxiety, excessive worry, alcohol/drug problems, a loss of motivation, or problems with eating and/or sleeping can all interfere with optimal academic performance. We encourage all students to reach out to talk with someone, and we want to make sure you are aware that you can access mental health support at the Counseling Center (<https://counselingcenter.illinois.edu/>) or McKinley Health Center (<https://counselingcenter.illinois.edu/>). For mental health emergencies, you can call 911 or walk into the Counseling Center, no appointment needed.

Disruptive Behavior: Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students’ ability to learn and an instructor’s ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office for Student Conflict Resolution for disciplinary action.

Emergency Response Recommendations: Emergency response recommendations can be found at the following website: <https://police.illinois.edu/em/planning/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class. <https://police.illinois.edu/em/building-emergency-action-plans/>.

Religious Observances: The Religious Observance Accommodation Request form is available at <https://odos.illinois.edu/community-of-care/resources/students/religious-observances/>. Submit the form to the instructor and to the Office of the Dean of Students (helpdean@illinois.edu) as soon as possible.

Family Educational Rights and Privacy Act (FERPA): Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <http://registrar.illinois.edu/ferpa> for more information on FERPA. Student information and records will not be released to anyone other than the student unless the student has provided written approval or as required by law.

Sexual Misconduct Reporting Obligation The University of Illinois is committed to combatting sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <http://www.wecare.illinois.edu/resources/students/confidential>. Other information about resources and reporting is available here: <http://wecare.illinois.edu/>.

Student Support The Counseling Center is committed to providing a range of services intended to help students develop improved coping skills in order to address emotional, interpersonal, and academic concerns. Please visit their [website](#) to find valuable resources and services.

Counseling Center Information: 217-333-3704

Location: Room 206, Student Services Building (610 East John Street, Champaign IL)

McKinley Mental Health Information: 217-333-2705

Location: 3rd Floor McKinley Health Center 1109 South Lincoln, Urbana, IL

Emergency Dean: The Emergency Dean may be reached at (217) 333-0050 and supports students who are experiencing an emergency situation after 5 pm, in which an immediate University response is needed and which cannot wait until the next business day. The Emergency Dean is not a substitute for trained emergency personnel such as 911, Police or Fire. If you are experiencing a life threatening emergency, call 911. Please review the Emergency Dean procedures: <https://odos.illinois.edu/community-of-care/emergency-dean>

Academic Dates and Deadlines: Students should make note of important academic deadlines for making changes to their courses (add, drop, credit/no-credit, grade replacement, etc.).

<https://registrar.illinois.edu/academic-calendars> Please check with your academic department regarding specific procedures and policies.

Modifications: The instructor reserves the right to make changes to the course as deemed academically appropriate. Any such changes will be announced in class and posted on Canvas. Students are responsible for staying informed and keeping track of all course announcements.