**Technology and Economics**

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This course examines the interaction between technology and markets from an interdisciplinary perspective. We discuss how economic/social institutions determine technological developments – which in turn shape the economy and the society. Our objective is to understand this interdependence from economic, historical, and philosophical perspectives.

The first part of the course can be summarized as microeconomics of innovation. The subjects include the efficiency of R&D in a market economy, innovation as the engine of economic growth, and the race between education and technology. The second part of the course

examines the history and the future of rapid technological progress. So we first focus on the Industrial Revolution, which occurred in the mid-18th century, to understand the history of technology. Then the economic impacts of artificial intelligence, machine learning, and robotization in the 21st century are discussed to understand the future of technology. The course concludes with a discussion on how the economic institutions (e.g. markets, laws, etc.) are shaped by technical change.

All subjects are motivated by empirical regularities and real - world data. Univariate calculus will be necessary for our theoretical discussions. A basic understanding of standard microeconomics is a plus. There are lecture notes that summarize the class and provide a list of supplementary reading materials each week.

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| **Subjects** | **Readings** |
| 1. Basic concepts and introduction | Lecture notes |
| 2. What is Technology? | Lecture notes |
| 3: Research and Development I: Efficiency  | Arrow, Kenneth Joseph. "Economic welfare and the allocation of resources for invention." *Readings in industrial economics*. Palgrave, London, 1972. 219-236. |
| 4: Research and Development II: Patent races | Stiglitz, Joseph E., and Bruce C. Greenwald. *Creating a learning society: A new approach to growth, development, and social progress*. Columbia University Press, 2014. |
| 5: Technology and Growth: Solow | Tirole, Jean. *The theory of industrial organization*. MIT press, 1988. |
| 6: Technology and Growth: Schumpeter | Stiglitz, Joseph E. "Leaders and followers: Perspectives on the Nordic model and the economics of innovation." *Journal of Public Economics* 127 (2015): 3-16. |
| 7: The Race Between Education and Technology | Goldin, Claudia Dale, and Lawrence F. Katz. *The race between education and technology*. Harvard University Press, 2009. |
| 8: Technology and Income Distribution |  |
| 9: Industrial revolution in the 18th century | Allen, Robert C. "Why the industrial revolution was British: commerce, induced invention, and the scientific revolution1." *The Economic History Review* 64.2 (2011): 357-384. |
| 10: Rise of the robots in the 21st century | Autor, David H. "Why are there still so many jobs? The history and future of workplace automation." *Journal of Economic Perspectives* 29.3 (2015): 3-30.Ford, Martin. *Rise of the Robots: Technology and the Threat of a Jobless Future*. Basic Books, 2015. |
| 11: Do machines make history? | Heilbroner, Robert L. "Do machines make history?" *Technology and culture*8.3 (1967): 335-345. |