This course surveys a broad range of issues concerning the relationship between technological change and social and political development from a theoretical, historical and comparative perspective. The principal objectives are to explore the growing centrality of science and technology in political affairs generally, and its current significance for public policy in particular; to examine the conceptual tools that political economy brings to bear on an analysis of the nature of technological change; and to assess the implications of the development of social and political institutions at the national and international level for the process of technological innovation in the current period and the policy implications of that relationship.

The course will be based on a seminar format. Assignments for the course will consist of seminar participation and a major paper. The exact format for the conduct of the seminars will be discussed and agreed upon at the first class. Essays should be chosen from the topics outlined for each term. Variations upon these themes will be considered at the instructor's prerogative. Undergraduate essays are to be 4,000 words long and graduate essays 6,000 words long. Undergraduates must submit a five page outline and annotated bibliography before reading week. Each will count for 10% of the final grade. Essays are due the final week of the term. The paper will count for 70% of the final grade (60 % for undergraduates). Seminar participation and presentations will be worth 30%.

Required readings for each week are marked with an (*). Students are encouraged to read as many of the required readings for each week as possible.

Recommended Text:


POL 409S/2307S Course Readings available online.

* * *
**COURSE POLICIES**

**Office hours:**

If you have questions about the readings, seminar discussions, or assignments, office hours are best. No appointment is needed. If you cannot make office hours but would like to meet, I can often chat for a few minutes after the class and can sometimes schedule another meeting time on the spot. Otherwise, contact me by emails to schedule a mutually agreeable alternative time.

**Email:**

Email is an effective way to communicate for short, quick questions, but extended conversations are best conducted face to face during office hours or in a special appointment.

**Keep copies:**

Students are advised to keep copies of all their draft work and hard copies of their assignments, including drafts of their assignments, until the marked assignments have been returned.

**Plagiarism:**

Make sure that the information in your essays and on your tests is presented in your own words. PLAGIARISM is a serious academic offence at the University of Toronto and will be treated according to the rules in the university’s Code of Behaviour.

For further clarification and information, please see the University of Toronto’s policy on Plagiarism at http://www.utoronto.ca/writing/plagsep.html. This course uses Turnitin.com (as described in the next section on Essays below).

**Extensions:**

Under extraordinary circumstances, consideration will be given to granting an extension based on an official medical note from a doctor or from the University specifying extreme family circumstances.

**Accessibility Needs:**

The University of Toronto is committed to accessibility. If you require accommodations or have any accessibility concerns, please visit http://studentlife.utoronto.ca/accessibility.
TOPICS: First Term

1. Introduction to the course and discussion of outlines
2. What is Technology?
3. Long Waves and Technological Change
4. Technology, Institutions and Socio-Political Change
5. Science and Technology in the Fourth Kondratiev
6. The IT Revolution – A New Techno-Economic Paradigm?
7. The Algorithmic Revolution or “Why Software is Eating the World”
8. Technology and Globalization (including something on the role of IT in GPNs)
9. The End of the Auto-Industrial Age and the Future of Mobility
10. AI, Robotics and the Future of Employment
11. The State of the Digital Economy and Innovation Policy in Canada
12. The IT Paradigm and the Future of Economic Growth
Readings by Topic

Readings marked by an asterisk (*) are required readings on each topic.

1. Introduction to the course and discussion of outlines

2. What is Technology?

*W. Brian Arthur, The Nature of Technology: What It is and How It Evolves, ch. 2, 9


J. David Bolter, Turing’s Man: Western Culture in the Computer Age, ch. 2


Nathan Rosenberg, “The Historiography of Technical Progress,” in Inside the Black Box

Lewis Mumford, Technics and Civilization


3. Long Waves and Technological Change


Carlota Perez, *Technological Revolutions and Financial Capital*, pp. 3-32.


J.J. Van Duijn, *The Long Wave in Economic Life*

Luc Soete, “Technical Innovation and long waves: an inquiry into the nature and wealth of Christopher Freeman’s thinking,” in *Technology and the Human Prospect*, ed. Roy Macleod

C. Freeman, J. Clark, and L. Soete, *Unemployment and Technical Innovation*, ch. 2-4

George Modelski and William R. Thompson, *Leading Sectors and World Powers*

Joseph Schumpeter, *Capitalism, Socialism and Democracy*, esp. ch. 7

Christopher Freeman, ed., *Long Waves in the World Economy*

4. Technology, Institutions and Socio-Political Change


K. Neilson and B. Johnson, *Institutions and Economic Change: New Perspectives on Markets, Firms and Technology*


J. Rogers Hollingsworth and Robert Boyer, eds, *Contemporary Capitalism: The Embeddedness of Institutions*


5. **Science and Technology in the Fourth Kondratiev**

*C. Freeman and F. Louca, As Time Goes By*, pp. 272-300


or


*L. Weiss, America Inc.? Innovation and Enterprise in the National Security State*, ch. 2

*N. Research Council of the National Academies, Innovation in Information Technology*, ch. 1

David C. Mowery and Nathan Rosenberg, *Technology and the Pursuit of Economic Growth*

Donald E. Stokes, *Pasteur’s Quadrant: Basic Science and Technological Innovation*


David Mowery and Nathan Rosenberg, *Paths of Innovation: Technological Innovation in 20th Century America*

C. Freeman, J. Clark, and L. Soete, *Unemployment and Technical Innovation*, ch. 6, 7, 8

OECD, *Technical Change and Economic Policy*


Daniel L. Kleinman, *Politics on the Endless Frontier: Postwar Research Policy in the United States*


### 6. The IT Revolution – A New Techno-Economic Paradigm?

*Manuel Castells, *The Rise of the Network Economy*, ch. 1

*C. Freeman and F. Louca, *As Time Goes By*, pp. 301-335

*Carlota Perez, *Technological Revolutions and Financial Capital*, pp. 36-59.

*Manuel Castells, *The Internet Galaxy*, ch. 3


Marianna Mazucato, *The Entrepreneurial State*, ch. 5

David Mowery and Timothy Simcoe, “The Internet,” in Benn Steil, et al., *Technological Innovation and Economic Performance*

National Academies of Sciences, Engineering and Medicine, *Continuing Innovation in Information Technology*, 2016.


C. Freeman and L. Soete, Work for all or Mass Unemployment: Computerized Technical Change in the 21st Century

Daniel E. Sichel, The Computer Revolution: An Economic Perspective

Gregory Tassey, “Strategic Shifts in the IT Economy,” ch. 7 of The Technology Imperative

Roger Alcaly, The New Economy, ch. 1, 2 (pp. 52-60)

Peter F. Cowhey and Jonathan D. Aronson, Transforming Global Information and Communication Markets.

Erik Brynjolfsson and Adam Saunders, Wired for Innovation: How Information Technology is Reshaping the Economy?

Martin Fransman, Telecoms in the Internet Age: From Boom to Bust to ...

Dan Schiller, Digital Capitalism: Networking the Global Market System

National Research Council, The Internet’s Coming of Age

OECD, A New Economy: The Changing Role of Innovation and Information Technology in Growth

7. The Algorithmic Revolution or “Why Software is Eating the World”


Erik Brynjolfsson and Andrew McAfee, *Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*

Brie-IGCC E-conomy Project, *Tracking a Transformation: E-Commerce and the Terms of Competition in Industries*

John Zysman and Abraham Newman, eds, *How Revolutionary was the Digital Revolution?*

Steven Weber, *The Success of Open Source*

### 8. IT and the Globalization of Production

*Manuel Castells, *The Rise of the Network Society*, ch. 2 (pp. 92-147)


Greg Linden, Jason Dedrick and Kenneth L. Kraemer, “Innovation and Job Creation in a Global Economy: The Case of Apple’s iPod,” *Journal of International Commerce & Economics*


Gregory Tassey, “The Globalization of Technology,” ch. 1 of *The Technology Imperative*


OECD, “Technology and Globalisation,” ch. 10 in *Technology and the Economy: The Key Relationships*


9. The End of the Auto-Industrial Age and the Future of Mobility


McKinsey&Company, Automotive revolution—perspective towards 2030: How the convergence of disruptive technology-driven trends could transform the auto industry


Acatech, National Academy of Science and Engineering, Securing the future of German manufacturing industry: Recommendations for implementing the strategic initiative INDUSTRIE 4.0

McKinsey Global Institute, The Internet of Things: Mapping the Value Beyond the Hype, 2015.

10. AI, Robotics and the Future of Employment


Manuel Castells, The Rise of the Network Society, ch. 4

11. The State of the Digital Economy and Innovation Policy in Canada


*Council of Canadian Academies, Competing in the Global Innovation Economy: The Current State of R&D in Canada, ch. 6-7. Available online: scienceadvice.ca


*Deloitte, Canada’s Age of Disruption, Toronto.

Innovation, Science and Economic Development Canada, Building a Nation of Innovators, Ottawa.

Council of Canadian Academies, Paradox Lost: Explaining Canada’s Research Strengths and Innovation Weakness available online at: scienceadvice.ca


Science Technology and Innovation Council, State of the Nation 2014
12. The IT Paradigm and the Future of Economic Growth


and


*Erik Brynjolfsson and Andrew McAfee, The Second Machine Age, ch. 2, 15

and

*Carlota Perez, “Second Machine Age or Fifth Technological Revolution, Parts 1 to 9”, http://beyonddethe technological revolution.com/second-machine-age-or-fifth-technological-revolution


Robert J. Gordon, The Rise and Fall of American Economic Growth, ch. 17

Tim O’Reilly, WTF: What is Technology’s Future and ...

Robert Boyer, “The long-term historical outlook after the Internet bubble,” ch. 7 of *The Future of Economic Growth: As New Becomes Old*

Tyler Cowen, *The Great Stagnation: How America Ate All the Low-Hanging Fruit of Modern History, Got Sick, and Will(Eventually) Feel Better*

Kevin Kelly, *What Technology Wants*

William Lazonick, *Sustainable Prosperity in the New Economy*

Michael J. Mandel, *The Internet Depression: The Boom, The Bust and Beyond*