

CENTRE FOR INTERNATIONAL TRADE AND DEVELOPMENT

M.A. Economics (World Economy)

IE521: Economics of Technology and Development

Semester: Winter
Type: Optional
Credits: 4
Instructor: Professor Amit Shovon Ray

Course Objective:

Technology has been recognised as a key driving force behind economic growth and prosperity. There is a growing literature on the economics of technological progress, cutting across theories of industrial organisation, economic development and evolutionary economics. The objective of this course is to introduce students to this important literature, especially from the perspective of developing countries.

Course Outline:

- I. Introduction:
 - a. Locating Technology in a discourse on development
 - b. Definitions and concepts:
 - i. Technological change and its biases
 - ii. Various classifications and nomenclatures:
 - iii. R&D – alternative views
 - iv. Non-R&D sources of technological change
- II. Firms, Innovation and Market Structure
 - a. The Schumpeterian hypothesis
 - b. Incentives to innovate under alternative market forms: neoclassical models
 - c. Empirical validation of the Schumpeterian hypothesis
- III. Appropriability and Patents
 - a. Problems of appropriability, market failure and solutions
 - b. Knowledge flows and spillovers
 - c. Economics of Patents
 - i. History, Justification
 - ii. Economic models of patent races and optimal patents
 - iii. Nuts and bolts of patents and other forms of IPR
 - iv. Uses and misuses of patenting
- IV. Diffusion of Innovation
 - a. Models of diffusion for standalone technologies
 - b. Multiple technologies and network externalities
 - c. Strategic adoption of technologies

V. Learning and Technological Capability in Developing Countries

- a. R&D for learning
- b. Stages of Technological Capability (TC)
- c. Evolution of TC: The role of IPR
- d. Importance of TC for competitiveness and exports
- e. Understanding India's emergence through TC

VI. Science and Innovation

- a. Importance of Public Funded Research
- b. University-industry knowledge transfer

Readings:

Books (selected chapters)

- Tirole, J (1988), *The Theory of Industrial Organisation*, Chapter 10, MIT Press: Cambridge, MA.
- Schumpeter, J. (1943), *Capitalism, Socialism and Democracy*, Chapters 7 and 8, Unwin: London.
- Stoneman, Paul (ed.) (1995), *Handbook of Economics of Innovation and Technological Change*, Chapters 1, 4, Blackwell: Oxford.
- Greenhalgh, C. and M. Rogers (2010), *Innovation, IP and Growth*, Chapter 2, 6, Princeton University Press: Princeton.
- Machlup, F. (1958), "An Economic review of the patent system", *US Senate Committee Report*, Washington DC: US Govt.
- Stoneman, P. (2002), *The Economics of Technological Diffusion*, Chapters 1 – 5, Blackwell: Oxford.
- Lall, S (1987), *Learning to Industrialise*, Chapters 1,2,8,9, London: MacMillan.
- Stewart, F. (1977), *Technology and Underdevelopment*, Chapters 1-5, MacMillan: London.

Journal articles

- Fischer, F.M. and P. Temin (1973), "Returns to Scale in Research and Development: What does Schumpeterian Hypothesis Imply?" *Journal of Political Economy*, Vol 81 No.1.
- Kamien, M. and N. Schwartz (1975), "Market Structure and Innovation: A Survey", *Journal of Economic Literature*, Vol 13 No 1.
- Scherer, F.M. (1972), "Nordhaus' Theory of Optimal Patent Life", *American Economic Review* 62 (3), pp 422-427.
- Cohen W.M. and D Levinthal (1989), "Innovation and Learning: The two faces of R&D," *The Economic Journal*, Vol 99, 1989.
- Teitel, S. (1984), Technology Creation in Semi-Industrialised Economies, *Journal of Development Economics*, 16, pp 39-61.
- Katz, J. (1984), "Domestic Technological Innovations and Dynamic Comparative Advantage, *Journal of Development Economics*, 16, pp 13-37.

- Ray, A.S. and S. Bhaduri (2001), “R&D and Technological Learning in Indian Industry: Econometric Estimation of the Research Production Function”, *Oxford Development Studies*, Vol 29 (2).
- Bhaduri, S. and A. S. Ray (2004), “Exporting through Technological Capability: Econometric Evidence from Indian Pharmaceutical and Electronics/Electrical Firms”, *Oxford Development Studies*, Vol 32 No.1
- Sengupta, A. and A.S. Ray (2017), "University Research and Knowledge Transfer: A Dynamic View of Ambidexterity in British Universities", *Research Policy*, 46 (5)

Chapters in Edited Volumes

- Stiglitz, Joseph (1987), “On the Microeconomics of Technological Progress”, Chapter 2 in J. Katz (ed), *Technology Generation in Latin American Industries*, MacMillan: London.
- Stephan, P. (2010), “Economics of Science”, Chapter 5 in B. Hall and N. Rosenberg (eds.), *Handbook of the Economics of Innovation*, Elsevier: Amsterdam, Vol I.
- Foray, D. and F. Lissoni, (2010), “University Research and Private-Public Interaction”, Chapter 6 in B. Hall and N. Rosenberg (eds.), *Handbook of the Economics of Innovation*, Elsevier: Amsterdam, Vol I.