Centre for International Trade and Development
School of International Studies

Course: MA in Economics (with specialisation in World Economy)
Course Title: IE 521: Economics of Technology and Development
Course Type: Optional
Course Teacher: Professor Amit S Ray
Credits: 4
Contact Hours: 4 per week

Course Objectives

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.

Learning Outcomes

- A sound theoretical understanding of the nature and drivers of technological change and its consequences for economic development.
- Gain an analytical perspective on the role of institutions and policy in the facilitating innovation
- Prepare students for research in this area by nurturing their ability to think conceptually and creatively to formulate research puzzles and to address these puzzles
- Hone their writing and presentation skills

Evaluation Methods

Evaluation will have two components – (1) End Semester examination and (2) one term paper

Course Content

I. Introduction:
   a. Locating Technology in a discourse on development
   b. Definitions and concepts
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. Economics of Patents
   c. Evidence on the methods of appropriability
   d. Knowledge flows and spillovers
IV. Diffusion of Innovations
   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 technological learning
b. 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
f. Appropriate Technology -3

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.
- Schumepter, J. (1943), *Capitalism, Socialism and Democracy*, Chapters 7 and 8, Unwin: London.
- Stoneman, Paul (1983), *The Economic Analysis of Technological Change*, Chapter 1, Oxford University Press: Oxford.
- 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.
- Katz, J. (ed.) (1987), *Technology Generation in Latin American Industries*, MacMillan: London, Chapters 1-4
- Gonsen, R. (1998), *Technological Capabilities in Developing Countries*, Chapter 2, London: MacMillan.
- Stewart, F. (1977), *Technology and Underdevelopment*, Chapters 1-5, MacMillan: London.

Journal articles

- Dasgupta, P. and J. Stiglitz (1980), "Industrial Structure and Nature of Innovative Activity," ***Economic Journal***, Vol 90 No 358.
- 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.