

**Centre for Studies in Science Policy
School of Social Sciences**

Course Title	:	Analysis in Science & Technology Policy
Course No. & Type	:	SP 601 (M.Phil./Ph.D.) Compulsory
Faculty in charge	:	Pranav N. Desai & S. Bhaduri
Mode of Evaluation	:	1. A term paper on a selected problem (40%) 2. Seminar presentation (30%) 3. Book Reviews (30%)
Credits	:	4
Instruction Method	:	Lecture-cum-Seminar

1. Nature of the Course

This course has been designed to cater to the needs of M.Phil. /Ph.D. students in the area of science policy studies. It exposes students to various socioeconomic and political dimensions of S&T. At the same time enables them to acquire applied skills to solve S&T as well as social problems. It has been conceived under certain assumptions: Science and technology have, in modern times become a force of almost all-pervasive character. This realization is being reflected in the accelerated growth of funding, human resource and activities of scientific enterprise since the 1950s. The issues involving S&T have been appearing with increasing frequency on the national as well as international agenda along with emergence of science policy and planning organization. The increasing complexity of science-society-Nature interrelationship is not only going to have implications for scientists, administrators and planners of science and science policy analyst but also a common man. The main focus of this course is intended to be on India and the developing countries.

II. Course Outline

1. Introduction:
Science Policy Studies in Historical Perspective, Changing Nature of Science, Technology and Society and their Interrelationship, Approaches to Science Policy (Anthropological, Epistemological, Empiricist/Scientometric and Critical/Ethical Approach).
2. Role of Science Policy
Coordination, Promotion, Regulation, Twin Responsibility for Social and S&T Development
3. A framework for Science Policy Analysis
Components and Levels of Information and the Role of Information Technology Revolution, Integration of Objectives, Evaluation of Priorities, Taxonomy of S&T Organization, Concepts & Historical Perspective on Technology Assessment and Forecasting (TATF). Role of TATF, Relevance of TATF to the Developing Countries, Ethical Issues and Overall Socioeconomic TATF.
4. Political Dimensions of Science Policy Structure in India Evaluation of Apex Science Policy Body, S&T in Parliament, State S&T Councils
5. Scientific Productivity and Innovation Policy

- Determinants, Evolution of Innovation Policy, Generation, Selection Absorption and Diffusion of Technology
6. Interaction between S&T and Economic Policies, Sectoral Policies such as Agriculture, Industry, Health and Environment, Defense, Space, Ocean, Etc., S&T Plans.
 7. Human Resource for S&T Trends Issues of Planning
 8. International Cooperation & Competition Rationale, types of S & T Cooperation, Current Issues (International Patent Regime, WTO, Labour Standards, Convention on Biodiversity, etc.).
 9. A Comparative Perspective on Science Policies and Strategies. S & T Policies in Major Developed Countries, Issues and Trends in Developing Countries
 10. S&T Policy Instruments and Implementation Science Policy Resolution (1958) Technology Policy Statement (1983), A Draft Paper for New Technology Policy (1993), Technology Mission.
 11. The conventional economic rationale behind policy interventions in the area of science and technology-public good characteristics of knowledge, and associated problems of market failure. The Bush model-policy interventions in basic science and applied science.
 12. Trade in technology: asymmetric information, role of demand side factors, aspects of factor bias, the issue of appropriate technology
 13. Economic rationale behind policy interventions in the context of developing economies-building up of technological capability.
 14. Evolutionary theory of policy making: reexamining the argument of market failure, bounded rationality in policy making.
 15. Learning and path dependence in policy making: the issue of policy transfer and homogenization of policy framework across countries-the case of the Intellectual Property Rights regime.

Essential Readings

- Adboye, T. and Clark, N. (1997) 'Methodological Issues in Science and Technology Policy Research: Technological Capability', *Science, Technology and Society*, 2(1), pp.73-98
- Andrew F.M. (1979), *Scientific Productivity* (University Press, London).
- Bastos, Maria-Ines (1996), "Science and Technology Policies in Developing Countries: A Political Analysis of Latin American Practice and Prospects", *Science, Technology and Society*, Vol.1 No.2, July-December 1996, pp.225-247.
- Bhagavan, M.R. (1990), *Technological Advance in the Third World: Strategies and Prospects* (Zed Books Ltd. London)
- Caldwell Lynton Keith (1984), *International Environmental Policy: Emergence and Dimensions* (Duke Press Policy Studies, Durham, North Carolina).
- Cooper, Charles (1978) *Science, Technology and Development: The Political Economy of Technological Advance in Underdeveloped Countries* (Frank Cass, London).
- Desai P.N. (1982), "Administration of International Cooperation in Indian Agricultural Research" *Agricultural Administration* (Applied Science Publishers Ltd., London, Vol. 10, No.1, May 1982), pp. 12-22.
- Desai P.N. (1990), Regional Perspective on Science, Technology and Industrial Development in Haryana, Himachal Pradesh, Jammu & Kashmir and Punjab"

- Technology for Development: Perspective on Northern India*. Vol. 1 edited by S. B. Rangnekar et al (CRRID, Chandigarh, 1990), pp. 10-16.
- Desai P.N. (1993), "Ocean Resource Planning", *Yojana* (Ministry of Information & Broadcasting, New Delhi, July 31, 1993), pp.6-7.
- Desai P.N. (1997), *Science Technology and International Cooperation* (Har-Anand Publications Pvt. Ltd. New Delhi).
- Dixit, Avinash K. (1996), *The making of economic policy: A Transaction cost-politics perspective*, MIT Press, Cambridge.
- Giovanni Dosi et al (eds) (1998), *Technical Change and Economic Theory* (Pinter Publishers, London/New York).
- Greenberg, Daniel S. (1969), *The Politics of American Science* (Harmandsworth, Penguin Books)
- Hughes, Kirsty (1988), "The Interpretation and Measurement of R & D Intensity". *Research Policy*, Vol. 17, No. 5, October 1988, pp. 301-307.
- Iyengar, M.S. (1964), "Some Observations on Scientific policy Resolution and its Implementation", *Vijan Karmee*, Vol. 16, No.3, March 1964, pp 3-10.
- Jasanoff, Sheila (1997) (ed.), *Comparative Science and Technology Policy* (Edward Elgar Publishing Limited, Cheltenham/Lyme)
- Juma, Calestous; Ojwang, Jackton B. (eds) (1989) *Innovation and Sovereignty: The Patent Debate in Africa Development* Nairobi, Kenya: African Centre for Technology Studies.
- Katz, J.M. (1987) (ed.), *Technology Generation in Latin American Manufacturing Industries*, Macmillan, London.
- Mansell, Robin and Uta When (eds) (1998), *Knowledge Societies: Information Technology for Sustainable Development* (Oxford University Press, New York).
- Murmann, P. (2003) *Knowledge and Competitive Advantage: The Coevolution of Firms, Technology and National Institutions*, Cambridge University Press.
- Naidu, P.K. (1967), "Science Policy and its Implementation (Crisis in science policy I)", *Mainstream*, Vol.5, No.35, April 129, 1967, pp.29-30, 38.
- Naidu, P.K. (1967) "Spotlight on CSIR (Science policy in Crisis II)", *Mainstream*, Vol.5, No.36, May 6, 1967 pp. 31-32.
- Noble, David, F. (1977), *America by Design: Science, Technology, and the Rise of Corporate Capitalism*, AA Knopf, New York.
- North, D.C. (1990), *Institutions, Institutional change and economic performance*, Cambridge University Press, Cambridge.
- Pelikan Pavel and Gerhard Wegner (2003) (eds.) *The Evolutionary Analysis of Economic Policy*, Edward Elger, Cheltenham, UK
- Rahman A. and K.D. Sharma (eds) (1974), *Science Policy Studies* (Somaiya publications Pvt. Ltd., New Delhi, Centre for Studies in Science Policy, Jawaharlal Nehru University.
- Rangarao, B.V. (1976), "Evolution of Apex Science Policy Body in India, *National Herald*, March 3 and April 1, 1976, p.5.
- Ranis, G. (1990), 'Science and Technology Policy: Lessons from Japan and the East Asian NICs', in R.E.Evenson and G.Ranis (eds.) *Science and Technology: Lessons for Development Policy*, Intermediate Technology Publications, London, pp.157-178.
- Ray, Amit S. (2003), *An Analysis of R&D Incentive in India*, Research report submitted to the Department of Science and Technology, Govt. of India.
- Radosevic, Slavo (1999), Patterns of Innovative Activities in Countries of Central and Eastern Europe: An Analysis Based on Comparison of Innovation Surveys (SPRU Electronic Working Papers Series Paper No. 34)

- Sheinin Y. (1978), *Science Policy: Problems and Trends* (Progress Publishers, Moscow).
- UNESCO (1979), *An Introduction to Policy Analysis in Science and Technology* (UNESCO, Paris, Science Policy Studies and Documents, No.46).
- Wang, Y.F. (1993), *China's Science and Technology Policy: 1949-1989* (Aldershot : Averbury).

Important Journals/Statistical Yearbook

1. *Research Policy*
2. *Science and Public Policy*
3. *World Review of Science, Technology and Sustainable Development*
4. DST (Biennial), *Research and Development Statistics* (Department of Science and Technology, Ministry of Science and Technology, Government of India, New Delhi).
5. *UNESCO Statistical Yearbook*

Important Links

1. NISTADS
<http://www.nistads.res.in/>
2. Research and Information System for Developing Countries
www.ris.org.in
3. UNU- Institute for New Technologies ([INTECH](http://www.intech.unu.edu))
<http://www.intech.unu.edu>
4. Science Policy Research Unit, Sussex
<http://www.sussex.ac.uk/spru/>

Recommended Readings

- Aichholzer, G., Schienstock, G. (eds) (1994), *Technology Policy: Towards an Integration of Social and Ecological Concerns* (de Gruyter, Berlin).
- Bernal, J.D. (1962), *Science for a Developing World* (World Federation of Scientific Workers, London).
- Clarke, Robin (1971), *Great Experiment: Science and Technology in the Second United Nations Development Decade* (United Nations, New York)
- Himsworth Harold (1970), *The Development and Organization of Scientific Knowledge* (Heinemann, London).
- Hodgson, G.M. (eds.) (2003), *Recent Developments in Institutional Economics*, Edward Elger, UK.
- Lee, H.H.; Tank F.E. (1989) *The Socioeconomic Impact of Agricultural Biotechnology on Less Developed Countries*. (World Employment Programme Research, Working Papers, WEP 2-22/WP. 199, International Labour Office, Geneva).
- Rangarao, B.V. (1970), "Regional Development of Science in India", *Science and Culture*, Vol.36 July, 1970, pp.365-373.
- Ruivo, B. (1987), "The Intellectual Labour Market in Developed and Developing Countries: Women's Representation in Scientific Research", *International Journal of Science Education*. Vol.9 No.3, 1987, pp.385-391.
- Segal, Aaron (1987), *Learning by Doing: Science and Technology in the Developing World* (Eestview Press. Westview Special Studies in Science, Technology and Public Policy, Boulder. (O/London).

- UN (1963), *Report of the United Nations Conference on the Application of Science and Technology for the Benefit of Less Developed Areas*. (United Nations, New York, 6 Vols).
- UNESCO (1965), *National Science Policies in Countries of South and South-East Asia*, (UNESCO, Paris Science Policy Studies and Documents, No.11)
- UNESCO, (1969), *The Promotion of Scientific Activity in Tropical Africa* (UNESCO, Paris, Science Policy Studies and Documents, No.11).
- UNESCO (1970), *Science and Technology in Asian Development* (UNESCO, Paris).
- Weinberg, Alvin M. (1967), *Reflections on Big Science*. (The M.I.T. Press, Cambridge, Mass).
- Yankey, George Sipa-Adjah (1987), *International Patents and Technology Transfer to Less Developed Countries: The Case of Ghana and Nigeria* (Aldershot, Avebury).