DISCIPLINE SPECIFIC ELECTIVE -4 (DSE-4) – Philosophy of Science

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Philosophy of Science DSE 4	4	3	1	Nil	12th Passed	None

Learning Objectives.

- The course will introduce students to the methods, assumptions, epistemological leanings and metaphysical implications of the domain of modern science
- The course offers some significant philosophical positions on: What is the nature of explanation in science? What are the laws of nature and how are they employed as a tool of explanation? What are the implications of the problem of induction for the scientific explanation?
- The course will introduce students to the problems raised by Hume, Popper, Lakatos, Feyerabend and other philosophers

Learning Outcomes

1. Students will learn to ask questions about science in a rational spirit of inquiry
2. The student will be enabled to discuss questions regarding the methods and assumptions of science
3. Students will develop a good understanding of the debates surrounding the growth, progress and achievements of science
4. The students will learn to appreciate the difference between science and other subjects

UNIT I: THE PROBLEM OF INDUCTION (9 Hours, 3 Weeks)

1. Hume: The Traditional Problem of Induction
2. The Uniformity of Nature
3. The Problem of Circularity

Essential/Recommended Readings:

- Hume, D. (2002). David Hume, An Enquiry Concerning Human Understanding (Section IV- parts 1 & 2). In M. Huemer (Ed.), *Epistemology: Contemporary readings* (pp. 298–306). Routledge. (Originally published in 1748).
- Salmon, Wesley C. (1953). The uniformity of nature. *Philosophy and Phenomenological Research* 14 (1):39-48.

UNIT II: OBSERVATION, LAWS OF NATURE AND SCIENTIFIC EXPLANATION (12 Hours, 4 Weeks)

1. Theory Ladenness of Observation
2. Two Models of Scientific Explanation
3. Laws and Regularities

Essential/Recommended Readings:

- Hanson, N. R. (1958). Observation. In *Patterns of discovery: An inquiry into the conceptual foundations of Science* (pp. 4–30). C.U.P.
- Hempel, C. G. (2007). Two models of scientific explanation. In Y. Balashov& A. Rosenberg (Eds.), *Philosophy of science: Contemporary readings* (pp. 45–55). essay, Routledge.
- Hildebrand, Tyler (2023). *Laws of Nature*. Cambridge: Cambridge University Press (Introduction, pp. 1-5)

UNIT III: THE METHODOLOGY OF SCIENCE-I (12 Hours, 4 Weeks)

1. The Problem of Demarcation
2. Karl Popper's Theory of Falsification
3. Lakatos: Scientific Research Programmes

Essential Readings:

- Popper, K. (1963). *Conjectures and Refutations*, 2nd ed., pp.33-46. Routledge.
- Popper, K. (1959).*The Logic of Scientific Discovery*, pp. 10-20, 57-73. Routledge.
- Lakatos, I. (1978). A Methodology of Scientific Research Programmes. In J. Worrall & G. Currie (Eds.), *The methodology of scientific research programmes: Philosophical papers (Vol. 1*, pp. 47–67). Cambridge University Press.

UNIT IV: THE METHODOLOGY OF SCIENCE-II (12 Hours, 4 Weeks)

1. Kuhn: Paradigm and Paradigm Shift
2. Feyerabend: Epistemological Anarchism

Essential/Recommended Readings

- Kuhn, T. (1962). *The Structure of Scientific Revolutions*. Chicago University Press, chapters 1-2, 11- 12.
- Feyerabend, P. (1981). In I. Hacking (Ed.),How to Defend Society Against Science. In *Scientific revolutions* (pp. 156–167). Oxford University Press.

Suggestive Readings

- Boyd, R., Gasper, P., & Trout, J. D. (1999). *The Philosophy of Science*. MIT Press.
- Curd, M., Cover, J. A., &Pincock, C. (Eds.). (2013). *Philosophy of science: The central issues*. W.W. Norton & Company.
- Feynman, R. P. (2010). *The Feynman lectures on physics* (Vol. 1), pp. 52—56. Basic Books.
- Godfrey-Smith, P. (2003). *Theory and reality: An introduction to the philosophy of science*. The University of Chicago Press.
- Humphreys, P. (Ed.). (2016). *The Oxford Handbook of Philosophy of Science*. Oxford University Press.
- Ladyman, J. (2002). *Understanding philosophy of science*. Routledge.
- Machamer, P., & Silberstein, M. J. (2008). *The Blackwell Guide to the Philosophy of Science*. Blackwell Publishers.
- Okasha, S. (2016). What is Science? In *Philosophy of science: A very short introduction* (2nd ed., pp. 1–15). Oxford University Press.
- Papineau, D. (1996). *The Philosophy of Science*. Oxford University Press.