



RESEARCH METHODOLOGY

PROF. SOUMITRO BANERJEE

Department of Physical Sciences
IISER Kolkata

TYPE OF COURSE : New | Elective | PG

COURSE DURATION : 12 Weeks (24 Jan' 22 - 15 Apr' 22)

EXAM DATE : April 23, 2022

INTENDED AUDIENCE : This is a compulsory course for all PhD students as mandated by UGC. Bachelor's and Master's students interested in pursuing a research career may also take it.

COURSE OUTLINE :

The course covers all the conceptual and methodological issues that go into successful conduction of research. That includes philosophy of science, the methodological issues in measurement, proposing and testing hypotheses, scientific communication and the ethical issues in the practice of science.

ABOUT INSTRUCTOR :

Prof. Soumitro Banerjee (born 1960) did his B.E. from the Bengal Engineering College (Calcutta University) in 1981, M.Tech. from IIT Delhi in 1983, and Ph.D. from the same Institute in 1987. He was in the faculty of the Indian Institute of Technology, Kharagpur, since 1986, and has moved to the Indian Institute of Science Education & Research, Kolkata, in 2009. Dr. Banerjee's area of research interest is nonlinear dynamics. He has published three books: "Nonlinear Phenomena in Power Electronics" (Ed: Banerjee and Verghese, IEEE Press, 2001), "Dynamics for Engineers" (Wiley, London, 2005), and "Wind Electrical Systems" (Oxford University Press, New Delhi, 2005). He is a recipient of the S. S. Bhatnagar Prize (2003), and was recognized as a "Highly Cited Author" by Thomson Reuters from 2004 to 2014. He is a Fellow of the Indian Academy of Sciences, the Indian National Academy of Engineering, the Indian National Science Academy, The World Academy of Sciences, and the IEEE.

COURSE PLAN :

Week 1: Philosophy of Science (subjective versus objective, materialism versus idealism, causality, etc.)

Week 2: Logical Reasoning (inductive logic, deductive logic, syllogistic logic)

Week 3: History of development of science and the influence of philosophy

Week 4: What Scientists Actually Do

Week 5: Forming a Hypothesis

Week 6: Techniques of Scientific Measurement

Week 7: Testing of hypothesis

Week 8: Methods of Theoretical Research

Week 9: The Art of Scientific Communication

Week 10: Presentation in Seminars and Conferences

Week 11: Sponsored Research

Week 12: Ethical Conduct in Science