Course Code – Philosophy of Science, and Social Science
General Elective JSGP

Programme – Semester Fall 2026

Course Information

Course Duration: 15 weeks Credit Hours: TBD

Meetings: ***TBD***

Location**: TBD**

Prerequisites: None

Equivalent Courses: Philosophy of science courses.

Exclusive Courses: None

Instructor Information

Instructor: Prof Dr Sudip Patra

Biography: Designation: Professor, JSGP, founding member, CEASP, OP Jindal Global University, India. OP JGU, Fellow Jindal India Institute, Fellow LINPR Italy.

Education: PhD, University of Glasgow, Scotland, Associate Fellow HE, UK, M.Sc., Coventry University, UK.
Research Specialization: Quantum-like modelling in decision theory, applications in social sciences, and complexity economics.
Other research interest: Foundations/ Philosophy of Science.
Brief profile
Dr Sudip Patra's research work lies in quantum-like modelling in cognitive science or particularly in decision theory, with applications in economics and other social sciences. Quantum-like modelling is a novel paradigm of interface between mathematical-philosophical foundations of quantum science (particularly information theory) and cognitive science. Quantum-like modelling is a novel framework of non-Boolean decision theory, which describes decision making at large (including AI) under ambiguity or 'radical uncertainty'. Dr Patra has been publishing in different peer reviewed journals, collaborating with pioneering scientists (Profs Partha Ghose, Stuart Kauffman, Menas Kafatos).

Recent Book publications

Forthcoming Book: with Menas C Kafatos, from Routledge 'complementary realities and the quantum world'. https://www.routledge.com/Complementary-Realities-and-the-Quantum-World/Patra-Kafatos/p/book/9781041171430
Ghose, P., & Patra, S. (2023). An Interdisciplinary Approach to Cognitive Modelling: A Framework Based on Philosophy and Modern Science (1st ed.). Routledge.
Co-Edited book: https://link.springer.com/book/9783031388323
Dr Patra has been invited for talks at prestigious institutions, for eg, Chapman University, US, Ohio State Uni, US, IIT Bombay, Aston University, UK, Chengmai University, Vietnam. Visitor at JNU, India,

Teaching interests

Dr Patra provides Masters and PhD level courses in complexity economics, and foundational thinking for example 'Unity of Knowledge' which is a co-taught course at PhD level. UG courses include behavioral economics and allied topics.

PhD supervision

Ongoing, as principal or co-supervisor. Areas include: quantum-like modelling in decision theory related to financial systems, complex adaptive systems in health policy making.
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1. Course Description

We live in an age of foundational breakthroughs, whether Artificial intelligence, or machine learning, or quantum computation and information, we are deeply embedded in science and technology. Our day to day to living, to global scale shifts in economies, are all deeply motivated by

science and technology, so much so that at times we take it for granted, as if breathing in and out. However, as serious students of science, particularly of social sciences, we need to try to understand the underlying thought processes generating such gigantic scientific and technological breakthroughs. Most important for any social scientist is to have a rigorous grasp of foundational principles and philosophical tenets of modern science. Such basic understandings, like that of what is science? How science can be screened from non-science? Or what are the synergies between natural and social sciences?, are critical for developing an approach towards science-technology-society. Hence the very course is a rigorous introduction to fundamental philosophical principles upon which modern scientific thinking is built upon.

The course does not require any earlier technical knowledge in natural sciences, however it requires an aptitude and mind to appreciate implications of science and technology in social life. The course, floated as a general elective, will cater to students from varied backgrounds. The course will introduce participants to the following dimensions.

a. What are the basic schools of thoughts in defining how science works?
b. What are the foundational principles upon which modern scientific methodology works?
c. Introduction to the works of most noted philosophers of modern science.
d. How natural and social sciences have inspired each other?
e. Brief introduction to some interdisciplinary frontier science frameworks.

Overall objective of the course is to cultivate a responsible and critical mind to understand science-technology-society's complex adaptive relationships, which would help in further development of modern day public policy architecture.

2. Course Intended Learning Objectives(Aim)

Course Intended Learning Outcomes	Teaching and Learning Activities	Assessments/ Activities
Basic but thorough understanding of foundational aspects of Science, and its interconnections with social sciences	**Discussion of specific texts, journal articles.**	**Group assignments, class presentations, written exams.**

3. Scheme of Evaluation and Grading

Evaluation breakup

Internal breakup 70%

Components 30% group assignments, 20% group presentations, 20% midterm examination.

External breakup: 30% written exam, closed book.

Grade Definition

4. Academic Integrity

Academic Honesty, Cheating, and Plagiarism.: as per University rules.

Participation/Attendance Policy

Use of phone/ texting/ laptop: Minimal, Laptops can be used for note making.

5. Keyword Syllabus: Philosophy, Basic science, Social Sciences, Interdisciplinary approach.

Course Material

TEXT REFS (only selected chapters)

Dear, P. (2025). The World as We Know It: From Natural Philosophy to Modern Science. Princeton University Press.
https://link.springer.com/book/10.1007/978-3-031-56049-1

Godfrey-Smith, P. (2009). Theory and reality: An introduction to the philosophy of science. In *Theory and reality*. University of Chicago Press.

Gorton, W. A. (2012). *Karl Popper and the social sciences*. State University of New York Press.

Agassi, J. (2014). *Popper and His Popular Critics: Thomas Kuhn, Paul Feyerabend and Imre Lakatos*. Springer.

Bohm, D., & Krishnamurti, J. (2002). *The limits of thought: Discussions between J. Krishnamurti and David Bohm*. Routledge.

Rovelli, C. (2021). *Helgoland: The Sunday Times bestseller*. Penguin UK.

Kafatos, M. C., Banerji, D., & Struppa, D. (2024). Quantum and Consciousness Revisited. *DK Printworld and Nalanda Consciousness Network*.

Ghose, P., & Patra, S. (2023). *An interdisciplinary approach to cognitive modelling: A framework based on philosophy and modern science*. Routledge.
https://www.routledge.com/Complementary-Realities-and-the-Quantum-World/Patra-Kafatos/p/book/9781041171430

Relevant journal articles

Olszewski, W., & Sandroni, A. (2011). Falsifiability. *American Economic Review*, *101*(2), 788-818.

Petina, A. (2026). Falsifiability in the Philosophy of Science: Methodological Foundations, Conditions of Applicability, and the Problem of Metamethodological Calibration.

Anand, G., Larson, E. C., & Mahoney, J. T. (2020). Thomas Kuhn on paradigms. *Production and Operations Management*, *29*(7), 1650-1657.

Orman, T. F. (2016). Paradigm" as a central concept in Thomas Kuhn's thought. *International Journal of Humanities and Social Science*, *6*(10), 47-52.

Patra, S., & Ghose, P. (2024). Modelling decision making uncertainty and contextuality. In *Partial Identification in Econometrics and Related Topics* (pp. 253-265). Cham: Springer Nature Switzerland.

6. Session Plan

Lecture No.	Topic	Instructor	REF/TEXT
Week 1	Why we need to raise foundational questions in science and technology? Roots of modern science in West and East.	SP	**Different texts as in the end ref, journal articles.**

Week 2	Parallel development of Mathematics and Science: *empiricism, abstraction, logicism*	SP	Theory and Reality (Peter Godfrey-Smith)
Week 3	Meaning of evidence based research: avoiding self-selection bias Importance of statistics in science, and its limitations	SP	
Week 4	Introduction to body of work of Karl Popper Conjecture, Falsifiability, Refutability, Science-Non-Science, Social science implications	SP	Several texts, and journal articles: selected chapters only
Week 5	Kuhn: Theory of Scientific revolution, implications for social sciences	SP	-do-
Week 6	Feyarabend's Pluralism, implications for social sciences	SP	-do-
Week 7	Modern philosophers in dialogue: *Bohm and Krishnamurti*	SP	Several texts, and online archives
Week 8	Eastern Philosophies and Modern science: *Middle path Buddhism and Quantum Physics, to beyond Boolean Logic in Eastern philosophies*	SP	Carlo Rovelli, Ghose and Patra, Patra and Kafatos : selected chapters
Week 9	Sociology of doing science Doing science is political	SP	Theory and Reality (Peter Godfrey-Smith)
Week 10	New frontiers and implications for social sciences: econophysics	SP	*Several recent texts: selected chapters only*
Week 11	Complex adaptive systems	SP	*Chapters from 'Making sense of Chaos' Framer*
Week 12	Quantum-like framework	SP	*Selected chapters only (Orrell, Ghose and patra, Patra and Kafatos)*
Week 13	Complexity economics, Garvity trade models as examples of interdisciplinary research	SP	-do-

Week 14	Guest Lecture sessions, with interaction	SP	Menas Kafatos/ Stu Kauffman/ Partha Ghose/ Jude Currivan…
Week 15	Bio-cosmology view of life	SP	Works of Kauffman, Marina Cortes, Lee Smolin, Andrea Roli, Sudip Patra (papers).
Week 15	Revision		