

Indian Institute of Technology Kanpur
Department of Humanities and Social Sciences
Proposal for a New Course

Course No: PHI4**

Course Title: Formal Epistemology

Per Week Lectures:(L) 3

Tutorial: 0

Laboratory:(P) 0

Additional Hours[0-2]:

Credits (3*L+2*T+P+A): 3-0-0-0

Duration of Course: Full Semester

Proposing Department/IDP : Department of Humanities and Social Sciences

Other Departments/IDPs which may be interested in the proposed course:
Cognitive Science. Computer Science, Economics, Mathematics

Other faculty members interested in teaching the proposed course:-

Proposing Instructor(s): A. V. Ravishankar Sarma

Course Description:

Formal epistemology is a branch of analytic philosophy that investigates knowledge and reasoning using formal tools from mathematics (probability) and logic. In this course, we will investigate knowledge and reasoning using mathematical and logical techniques such as probability theory and modal logic. The main stream epistemology is the subject matter of formal epistemology. In general, epistemology is organised around two main objectives. One in defining and securing knowledge while combating scepticism and the other in modelling the dynamics of epistemological and doxastic states (beliefs). Although mainstream epistemology has mostly concentrated on the former, formal approaches have largely focused on the latter.

Some intriguing topics in mainstream epistemology are handled using formal models based on probability theory and modal logic. These issues include the distinction between internalism and externalism, the problem of justification, induction, and social epistemology. The course is divided into two parts. The first part is concerned with modelling beliefs with probabilities, and the second with analysing knowledge and belief using epistemic logic. Though it has enjoyed a

resurgence in interest and use over the past two decades, formal epistemology nevertheless has several significant limitations despite its mathematical elegance. This course will additionally illustrate some of the limitations of formal epistemology.

Objective(s): The primary objective of the course is to emphasise logic and probability theory in addressing standard epistemological problems. This course will provide students with a foundational understanding of formal epistemology's motivation, methods, and relationship to traditional epistemology in order to prepare them for the intriguing world of formal epistemology.

Contents: Mainstream vs Formal Epistemology, belief and probability, belief and acceptance, pillars of Bayesianism, justification and probability, three approaches for justification: Foundationalism, coherentism, infinitism, knowledge, certainty and skepticism, Logics of knowledge and belief, Logical omniscience, common knowledge, basics of interactivist epistemology, limitations of formal epistemology.

Table: lecture wise breakup:

S. No	Broad Title	Topics	Lectures
1	Mainstream vs Formal Epistemology	Introduction and motivation, formal tools: probability and logic, foundations of formal epistemology	3
2	Belief and Probability:	graded and categorical beliefs, conditional probability and conditional beliefs, degree of belief raising theory of confirmation	6
3	Belief and acceptance	The threshold theory, Lottery Paradox, actual and ideal agents	3
4	Pillars of Bayesianism	Probabilism, Conditionalization, arguments for Conditionalization, objective vs subjective Bayesians	6
5	Justification and Probability	Justification and Probability & Three approaches: Foundationalism, Coherentism, Infinitism, Objections	4
6	Knowledge and probability	Knowledge, certainty, skepticism, rejection of knowledge requires certainty.	6

S. No	Broad Title	Topics	Lectures
7	Logic of Knowledge and beliefs	Basic concepts of epistemic logic: syntax and semantics, Common knowledge, awareness, problem of logical omniscience and distinction between explicit vs implicit beliefs.	6
8	Interactive Epistemology	Agency and interaction, strategies in the interaction, rationality constraints, David Lewis theory of elusive knowledge and convention	6

Short summary for including in the Courses of Study Booklet:

Formal epistemology is a young and vibrant field of research in Analytic philosophy. It mainly addresses problems of mainstream epistemology with the use of logic, probability theory, and other formal logic tools. The field covers concepts like knowledge, belief, certainty, rationality, reasoning, decision, justification, learning, agent interaction, and information processing.

Recommended books:

1. Bradley, D. (2015). A critical introduction to formal epistemology. Bloomsbury Publishing.'
2. Fagin, R., Halpern, J. Y., Moses, Y., Vardi, M. (2004). Reasoning about knowledge. MIT press.
3. Titelbaum 2021, Fundamentals of Bayesian Epistemology, Oxford University Press

Reference Books:

1. Arló-Costa, H., Hendricks, V. F., Van Benthem, J., Boensvang, H., Rendsvig, R. K. (2016). Readings in formal epistemology. Springer International Publishing Switzerland.
2. Glymour, C. Thinking Things Through. Cambridge, MA: MIT Press, 1992.
Hendricks, V. F. Mainstream and Formal Epistemology. New York: Cambridge University Press, 2006.
3. Williamson, T. Knowledge and Its Limits. Oxford: Oxford University Press, 2010.

4. Hintikka, J. (1962): Knowledge and Belief: An Introduction to the Logic of the Two Notions. Cornell: Cornell University Press.
5. Adams, E. W. (1998). A Primer of Probability Logic, CSLI Publication.
6. Stalnaker, R. (2006). On logics of knowledge and belief. Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition, 128(1), 169-199.
7. S. O., Hendricks, V. F., Kjeldahl, E. M. (2018). Introduction to formal philosophy. Springer International Publishing AG, part of Springer Nature.
8. Bovens, L., Hartmann, S. (2004). Bayesian epistemology. OUP Oxford.
9. Lewis, D. (2008). Convention: A philosophical study. John Wiley Sons.
- 10 Halpern, J. Y. (2017). Reasoning about uncertainty. MIT press.

Any other remarks: --



Dated: 26-02-2025

Proposer: A. V. Ravishankar Sarma

Dated: ..03-03-2025.....

DUGC/DPGC Convener: 

The course is approved / not approved

Chairman, SUGC/SPGC