

PHILOSOPHY OF SCIENCE (PHIL30049)

TIME AND PLACE: Tuesdays 10:00-11:00, Lecture Room 1.

Lectures and Seminars: Ioannis Votsis

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Seminars: Tuesdays 14:00 - 15:00

Tuesdays 15:00 - 16:00

Office hours: Tuesdays 13:00-14:00

Thursdays 11:00-12:00

This course is divided into three major themes: 1) Reduction and the Unity of Science, 2) Probability and Confirmation, and 3) Special Topics: Philosophy of Medicine. The aim of the course is to expose the student to some of the more technical debates in the philosophy of science. Among other things, the course offers students a chance to get a feel for the philosophy of a particular science – in this case the Philosophy of Medicine.

Here are some of the main questions we will be looking at: What kinds of relations exist between theories? Can new theories explain the success of their predecessors? Is science progressing towards unification? What do we mean by the term ‘probability’? What is the relationship between confirmation and explanation? Does the successful prediction of a hitherto unforeseen event provide more confirmation than the successful prediction of a well-known one? Can medicine be called a science? What do we mean by ‘health’ and ‘disease’? What is the role and evidential import of randomised controlled trials?

Main Textbook

Curd, M. and Cover, J.A. (eds.) (1998) *Philosophy of Science: The Central Issues*, New York: W.V. Norton & Company.

Coursework:

One essay to be handed in to the department office by **05/05/06**. The essay should be approximately 2500 words. Suggested essay topics will be distributed nearer the deadline.

PART I (weeks 1-4): REDUCTIONISM AND THE UNITY OF SCIENCE

Week 1: Reductionism

Essential Reading:

Nagel, E. (1974) ‘Issues in the Logic of Reductive Explanations’, in Curd and Cover, pp. 905-921.

Further Reading:

Hempel, C. (1966) *Philosophy of Natural Science*, Englewood Cliffs: Prentice-Hall, ch. 8.

Nagel, E. (1961) *The Structure of Science*, London: Routledge and Kegan Paul, ch. 11.

- Schaffner, K. (1967) 'Approaches to Reduction', *Philosophy of Science*, vol. 34: 137-147.
- Sklar, L. (1967) 'Types of Intertheoretic Reduction', *British Journal for the Philosophy of Science*, vol. 18: 109–24.
- Sklar, L. (1999) 'The Reduction of Thermodynamics to Statistical Mechanics', *Philosophical Studies*, vol. 95: 187-202.

Week 2: Anti-Reductionism

Essential Reading:

Feyerabend, P.K. (1963) 'How to Be a Good Empiricist – A plea for Tolerance in Matters Epistemological', in Curd and Cover, pp. 922-949.

Further Reading:

- Kitcher, P. (1984) '1953 and All That: A Tale of Two Sciences', in Curd and Cover, pp. 971-1003.
- Nickles, T. (1975) 'Two concepts of Intertheoretic Reduction', in Curd and Cover, pp. 950-970.

Week 3: The Unity of Science

Essential Reading:

Weinberg, S. (1993) *Dreams of a Final Theory: The Scientist's Search for the Ultimate Laws of Nature*, London: Vintage, ch. 1.

Further Reading:

- Kemeny, J. and Oppenheim, P. (1956) 'On Reduction', *Philosophical Studies*, vol. 7: 6–18.
- Oppenheim, P. and Putnam, H. (1991) 'Unity of Science as a Working Hypothesis', repr. in Richard Boyd et al. (eds.) (1991): *The Philosophy of Science*. Cambridge(MA): MIT Press, ch. 22.

Week 4: The Disunity of Science

Essential Reading:

Cartwright, N. (1999) *The Dappled World: A Study of the Boundaries of Science*, Cambridge: CUP, pp. 1-19.

Further Reading:

- Dupré, J.A. (1983) 'The disunity of science', *Mind*, vol. 92: 321—346.
- Fodor, J. (1974) 'Special Sciences or the Disunity of Science as a Working Hypothesis', *Synthese*, vol. 28: 97-115.
- Galison, P. and Stump, D. J. (eds.) (1996) *Disunity of Science: Boundaries, Contexts and Power*, Palo Alto, CA: Stanford University Press.
- Rosenberg, A. (1994) *Instrumental Biology, or The Disunity of Science*, Chicago: Chicago University Press.
- Sklar, L. (2003): 'Dappled Theories in a Uniform World', *Philosophy of Science* 70: 424-441.

PART II (weeks 5-8): PROBABILITY AND CONFIRMATION

Week 5: Introduction to Probability

Essential Reading:

- Curd, M. and Cover, J.A. (1998) 'Commentary', in Curd and Cover, pp. 628-632.
Earman, J. and Salmon, W.C. (1999) 'The Confirmation of Scientific Hypotheses', in M. Salmon et al. (eds.) *Introduction to the Philosophy of Science*, Indianapolis: Hackett Publishing Company, ch. 2. pp. 66-77.

Further Reading:

- Gillies, D. (2000) *Philosophical Theories of Probability*, London: Routledge, ch. 1.
Hacking, I. (2001) *An Introduction to Probability and Inductive Logic*, Cambridge: Cambridge University Press, ch.6.
Skyrms, B. (2000) *Choice and Chance - An Introduction to Inductive Logic*, 4th edition, Belmont, CA: Wadsworth, ch. 6.

Week 6: Interpretations of the Probability Calculus

Essential Reading:

- Earman, J. and Salmon, W.C. (1999) 'The Confirmation of Scientific Hypotheses', in M. Salmon et al. (eds.) *Introduction to the Philosophy of Science*, Indianapolis: Hackett Publishing Company, ch. 2. pp. 77-89.

Further Reading:

- Gillies, D. (2000) *Philosophical Theories of Probability*, London: Routledge, chs. 2-9.
Hájek, A. (1997) '“Mises Redux” - Redux. Fifteen Arguments Against Finite Frequentism', *Erkenntnis*, vol. 45: 209-227.
Lewis, D. (1980) 'A Subjectivist's Guide to Objective Chance', in *Studies in Inductive Logic and Probability*, vol. II, R. Jeffrey (ed.), Berkeley: University of California Press.

Week 7: Confirmation

Essential Reading:

- Earman, J. and Salmon, W.C. (1999) 'The Confirmation of Scientific Hypotheses', in M. Salmon et al. (eds.) *Introduction to the Philosophy of Science*, Indianapolis: Hackett Publishing Company, ch. 2. pp. 42-49.
Hempel, C.G. (1962) 'Criteria of Confirmation and Acceptability', in Curd and Cover, pp. 445-459.

Further Reading:

- Carnap, R. (1971) 'Inductive Logic and Rational Decisions', in R. Carnap and R. Jeffrey (eds.) *Studies in Inductive Logic and Probability*, Berkeley: University of California Press, vol. I, 5-31.
Goodman, N. (1954) *Fact, Fiction, and Forecast*, Boston: Harvard University Press, ch. 3.
Hempel, C.G. (1945) 'Studies in the Logic of Confirmation: Part I', *Mind*, vol.54: 1-26.

- Hempel, C.G. (1945) 'Studies in the Logic of Confirmation: Part II', *Mind*, vol.54: 97-121.
- Popper, K.R. (1972) 'Conjectural Knowledge: My Solution to the Problem of Induction', in *Objective Knowledge*, Oxford: Clarendon Press.
- Quine, W.V.O. (1969) 'Natural Kinds', in *Ontological Relativity and Other Essays*, New York: Columbia University Press.

Week 8: Bayesianism

Essential Reading:

Glymour, C. (1980) 'Why I am not a Bayesian', in Curd and Cover, pp. 584-606.

Further Reading:

- Earman, J. and Salmon, W.C. (1999) 'The Confirmation of Scientific Hypotheses', in M. Salmon et al. (eds.) *Introduction to the Philosophy of Science*, Indianapolis: Hackett Publishing Company, ch. 2. pp. 89-100.
- Horwich, P. (1993) 'Wittgensteinian Bayesianism', in Curd and Cover, pp. 607-624.
- Howson, C. and Urbach, P. (1989) *Scientific Reasoning. The Bayesian Approach*, Open Court.
- Salmon, W. (1990) 'Rationality and Objectivity in Science or Tom Kuhn meets Tom Bayes', in Curd and Cover, pp. 551-583.

PART III (weeks 9-12): PHILOSOPHY OF MEDICINE

Week 9: Is Medicine a Science?

Essential Reading:

- Schaffner, K. (1999) 'Philosophy of Medicine', in M. Salmon et al. (eds.) *Introduction to the Philosophy of Science*, Indianapolis: Hackett Publishing Company, ch. 8, pp. 310-317, 323-343.
- Munson, R. (1981) 'Why Medicine Cannot Be a Science', *The Journal of Medicine and Philosophy*, vol. 6:183-208.

Further Reading:

- Engel, G.L. (1981) 'The Clinical Application of the Biopsychological Model', *The Journal of Medicine and Philosophy*, vol. 6: 101-123.
- Pellegrino, E. (1976) 'Philosophy of Medicine: Problematic and Potential', *The Journal of Medicine and Philosophy*, vol. 1: 5-31.
- (1998) 'What the Philosophy of Medicine is', *Theoretical Medicine and Bioethics*, vol. 19: 315-336.
- Schaffner, K. (1977) 'Reduction, Reductionism, Values, and Progress in the Biomedical Sciences', in Robert Colodny (ed.) *Logic, Laws, and Life: Some Philosophical Complications*, Pittsburgh: Pittsburgh University Press.

Week 10: The Concepts of Medicine

Essential Reading:

- Engelhardt, H.T. (1996) *The Foundations of Bioethics*, New York: Oxford University Press, ch. 5.

Further Reading:

- Fleck, L. (1979) *Genesis and Development of a Scientific Fact*, translated by F. Bradley and T.J. Trenn, Chicago: University of Chicago Press.
- Taylor, F.K. (1979) *The Concepts of Illness, Disease and Morbus*, Cambridge: Cambridge University Press.
- Worrall, J. (2001) 'Defining Disease: Much Ado about Nothing?' in *Analectica Husserliana LXXII*, A.T. Tymieniecka and E. Agazzi (eds.), pp. 33-55.

Week 11: Medicine and Revolutions**Essential Reading:**

- Gillies, D. (2005) 'Hempelian and Kuhnian Approaches in the Philosophy of Medicine: The Semmelweis Case', *Studies in History and Philosophy of Biological and Biomedical Sciences*, vol. 36: 159-181.

Further Reading:

- Hempel, C. (1966) *Philosophy of Natural Science*, Prentice-Hall, chs. 1-3, pp. 1-32.
- Loudon, I. (1992) *Death in Childbirth*, Oxford: Clarendon Press, ch. 4, pp. 49 – 84.
- Semmelweis, I. (1861) *The Etiology, Concept, and Prophylaxis of Childbed Fever*, translated by K. Codell Carter, University of Wisconsin Press, 1983.

Week 12: Evidence in Medicine**Essential Reading:**

- Worrall, J. (2002) 'What Evidence is Evidence-Based Medicine?', *Philosophy of Science*, vol. 69(3): S316-S330.

Further Reading:

- Ashcroft, R.E. (2004) 'Current Epistemological Problems in Evidence Based Medicine', *Journal of Medical Ethics*, vol.30(2): 131-135.
- Grossman J, and Mackenzie F.J. (2005) 'The Randomized Controlled Trial - Gold Standard, or Merely Standard?', *Perspectives in Biology and Medicine*, vol. 48(4): 516-534.
- Kerridge R.K. and Saul, W.P. (2003) 'The Medical Emergency Team, Evidence-Based Medicine and Ethics', *Medical Journal of Australia*, vol.179(6): 313-315.
- Ledley, R.S. and Lusted, L.B. (1959) 'Reasoning Foundations of Medical Diagnosis', *Science* 130: 9–21.
- Schaffner, K. (1981) 'Modeling Medical Diagnosis: Logical and Computer Approaches', *Synthese*, vol. 47: 163–99.
- Schaffner, K. (1993) 'Clinical Trials and Causation: Bayesian Perspectives', *Statistics in Medicine*, vol. 12(1): 477–94.
- Upshur, R.E.G. (2005) 'Looking for Rules in a World of Exceptions: reflections on evidence-based practice', *Perspectives in Biology and Medicine*, vol. 48(4): 477-489.