

CAPSTONE COURSE PROPOSAL: SOUTHERN METHODIST UNIVERSITY

1. **Title of Course** : Causality Track A : Philosophy, History and the Social Sciences.

2. **Instructor** : D. S. G. Pollock, Economics and Statistics, Queen Mary College, University of London.

3. **Course Description** :

Catalogue Description : This course examines the role of causal explanation in History, Economics and the Social Sciences. The historical antecedents and the psychological roots of our modern notions of causality are analysed. The treatment of the problem of causality by the philosophers Hume and Kant is described, and a grammar of causal statements is established. Examples of causal analysis are drawn from History, Economic History and Economics.

Preamble : In his “Consideration of the Causes of the Greatness of the Romans and their Rise and Decline”, Montesquieu (1746) took as his starting point the principle that “There are general causes, moral or physical, which operate in every monarchy to raise it, maintain it, or overthrow it”, and that “all that occurs is subject to causes”.

Nowadays, western historians hesitate to enunciate general laws of history, and many of them would reject outright the Marxist notions of historical determinism; yet most would agree that the purpose of historical studies lies in the search for causal explanations or, in Dicey’s words, in the attempt to uncover the inner logic of events, rather than in the mere recording of historical facts.

However, a host of ambiguities and logical difficulties arise when we look closely at the concept of causality and at the role that it plays in History and the Social Sciences.

We begin this course with an examination of the primitive and prescientific notions of causality. We do so both in the context of the prescientific explanation of natural phenomena and in the light of the evidence, collected by Piaget and other psychologists, of the child’s use of causal language.

We then proceed to examine the opinions of the philosophers Hume and Kant and of the English empiricists as to the meaning of causal statements, and we attempt to construct a grammar of causal statements with the help of propositional logic.

The second part of the course consists of the detailed study of several theories of causation drawn from History, Economic History and Economics.

4. **Prerequisites** : None

5. **Topical Outline of the Course** :

- (i) Scientific and Prescientific Notions of Causality : The Laws of Men, The Laws of God and the Laws of Nature.

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- (ii) The Child's Conception of Causality : Michotte and Piaget.
- (iii) Hume, Kant and the Empiricist View of Causality.
- (iv) The Grammar of Causal Statements : Causality and Implication The Logician's View of Causality.
- (v) Causality and Historical Determinism : The Problem of Cleopatra's Nose.
- (vi) The Rejection of Marxist Determinism : Popper and the Poverty of Historicism.
- (vii) Historical Explanation : The Origins of the Second World War.
- (viii) Counterfactual Propositions and the New Economic History : Professor Fogel and the American Railroads.
- (ix) Causality and Economics : The Monetarists versus the Keynesians.

6. Capstone Goals :

7. Capstone Requirements :

8. Teaching Methods :

It is proposed that pairs of students will meet once a week over a five-week period to present written accounts and verbal summaries of their research into designated topics. In addition, there will be a weekly lecture cum seminar for the whole group wherein the tutor will expound the themes of the course as well as eliciting contributions from the students.

9. Method of Assessment :

Tutorial assignments will be marked and a final exam will be set.

10. Principal Readings :

The tutor will direct the students to the readings that are appropriate to their assignments. For most topics, there are a number of alternative sources. By the completion of the course, all students will have read from the following:

Hume, D., "A Treatise of Human Nature", Penguin Books.

Kant, E., "A Critique of Pure Reason", Everyman Classics.

Hicks, J. D., "Economics and Causality", Basil Blackwell.

Carr, E. H., "What is History?", Penguin Books.

11. There will be no laboratory.

12. Proposed Student Enrolment :

The course will be offered for the 1985 SMU Oxford Summer-School Programme from July 6th to August 9th.

Causality Track B

CAPSTONE COURSE PROPOSAL: SOUTHERN METHODIST UNIVERSITY

1. **Title of Course** : Causality Track B : Probability and Statistics.
2. **Instructor** : D. S. G. Pollock, Economics and Statistics, Queen Mary College, University of London.
3. **Course Description** :

Catalogue Description : This course examines the modern concepts of probability and randomness and describes how these concepts are used in pursuit of statistical and causal explanations of phenomena in the physical world and in society.

Preamble : In a frequently quoted passage from the preface of his “*Theorie Analytique des Probabilités*”, Laplace (1820) declared that, provided that it was sufficiently powerful, “An intelligence knowing all the forces acting in nature at a particular instant as well as the momentary positions of all things in the Universe would be able to comprehend, in one single formula, the motions of the largest bodies as well as the lightest atoms in the world”. Human intelligence is infinitely remote from this ideal and is capable of comprehending only a few of the infinite number of factors and circumstances affecting each event. Therefore, Laplace declared, we cannot aspire to the deterministic explanations that might be available to an infinite intelligence; and we are often constrained to resort to statistical explanations.

Since the early 1930’s, physicists have believed that Laplacian determinism is ruled out in principle as well as in practice; and that the fundamental events of the physical world require statistical explanations.

We begin this course by examining the roots of the modern ideas of randomness and probability. Some of the modern ideas were clarified in the 17th century in the course of the mathematical analysis of games of chance. Other fundamental ideas, including the modern axiomatic system of probability, were not clarified until the late 1930’s. Statisticians continue to differ in their opinions as to which are the legitimate practical applications of their mathematical system.

In the second part of the course, we examine some of the modern methodology for making causal inferences from statistical data, and we attempt to assess the scope for making spurious inferences. These techniques are illustrated with examples from physics, astronomy, economics, biometrics and cognitive psychology.

4. **Prerequisites** : None
5. **Topical Outline of the Course** :
 - (i) Gods Games and Gambling : The Origin and History of Statistical Ideas.
 - (ii) Coins, Random-Number Generators, Chaotic Systems and Random Walks.

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- (iii) The Axiomatisation of Probability : Keynes, von Mises and Kolmogorov.
- (iv) Markov Chains : Measuring the Impact of Malaria Eradication.
- (v) Chance in Modern Physics : Waves, Particles and Uncertainties.
- (vi) Time Series and Hidden Periodicities : Sunspots, Variable Stars and Wheat Prices.
- (vii) Spurious Correlation : Relationships between Economic Variables and the Lack thereof.
- (viii) Correlation and Causality : Causal Chains and the Identification Problem in Economics and Sociology.
- (ix) Correlation and Latent Variables : Factor Analysis in Biometrics and Cognitive Psychology.

6. Capstone Goals :

7. **Capstone Requirements :**

8. **Teaching Methods :**

It is proposed that pairs of students will meet once a week over a five-week period to present written accounts and verbal summaries of their research into designated topics. In addition, there will be a weekly lecture cum seminar for the whole group wherein the tutor will expound the themes of the course as well as eliciting contributions from the students.

9. **Method of Assessment :** Tutorial assignments will be marked and a final exam will be set.

10. **Principal Readings :**

The tutor will direct the students to the readings that are appropriate to their assignments. For most topics, there are a number of alternative sources. By the completion of the course, all students will have read from the following:

Weaver, W., "Lady Luck", Penguin Books.

Bohm, D., "Causality and Chance in Modern Physics", Routledge and Kegan Paul.

Gottman, J. M., "Time-Series Analysis : A Comprehensive Introduction for Social Scientists", Cambridge University Press.

Gould, S. J. "The Mismeasure of Man", Penguin Books.

11. There will be no laboratory.

12. **Proposed Student Enrolment :**

The course will be offered for the 1985 SMU Oxford Summer-School Programme from July 6th to August 9th.