Philosophy 211 Induction and Scientific Reasoning
MWF 1:10-2:00

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Textbook: *Choice and Chance*: *An Introduction to Inductive Logic* by Brian Skyrms

Additional readings will be posted on Blackboard.

Introduction:

This course is an introduction to inductive logic. Inductive logic seeks to identify the appropriate norms governing ampliative reasoning, reasoning which goes beyond what is deductively entailed by the premises of an argument. The probability calculus has become an incredibly valuable tool for modeling reasoning in contexts of uncertainty. In this class we will explore how the probability calculus is best used and interpreted in these contexts. Generally, the probability calculus will be used to represent to what degree premises support a conclusion, or how well evidence supports a hypothesis. Students in this course will come away understanding how to manipulate the probability calculus and how to deploy the probability calculus to guide their own reasoning and actions as well as how to represent scientific reasoning.

Learning Goals:

1. Students will be able to employ the probability calculus for simple proofs or evaluation of probabilities.

2. Students will be able to articulate different interpretations of the probability calculus as well as their strengths and weaknesses.

3. Students will be able to articulate the major paradoxes of confirmation theory and how Bayesian confirmation theory addresses these problems.

Grading and Exams:

10% attendance, 60% midterms, 30% Final.

Attendance is mandatory. You get three unexcused absences. Additional unexcused absences will incur 5% reduction in final grade up to a total of 10%. Absences will be excused after the fact only in case of extreme circumstances that could not have been anticipated. Moreover, proof of extreme circumstances is required. Absences may be excused before the fact and is up to my discretion. In all cases, please talk to me about any foreseeable problems as soon as you anticipate them. I'm far more lenient when you are forthright and anticipate difficulties.

I will pass out a study guide in advance of each exam detailing the format and the content of the exam. The final exam is cumulative.

Classroom courtesy:

Please turn off cell phones when you come into class. If you have to leave early, please indicate that to me before class begins, and let me know why you must leave early.

Special Needs:

Students with disabilities will receive reasonable modifications in this course. Your responsibilities are to request them from me with sufficient advance notice, and to be prepared to provide verification of disability and its impact from Disability Services. Please speak with me after class or during my office hours to discuss the details. For more information, visit the Disability Services for Students website at www.umt.edu/dss/

Very Tentative Syllabus: (updates provided on Blackboard)

Week 1: January 26, 28, 30 Introduction, Probability and Inductive Logic: Laying the groundwork

Read: Chapter 2

Week 2: February 2, 4, 6 The Problem of Induction

Read Chapter 3

Week 3: February 9, 11, 13 Review of Deductive Logic

Read Chapter 1, Eells Appendix 1 (PDF), Suber, Propositional Logic Terms and Symbols (PDF), Suber, Predicate Logic Terms and Symbols (PDF)

Week 4: February 18, 20 (NO CLASS MONDAY the 16th) The Probability Calculus

Read Chapter 6.

Week 5: February 23, 25, 27 Interpretation of Probability, logical probability and frequency interpretations

Read Chapter 7. Hájek, Interpretations of Probability, Stanford Encyclopedia of Philosophy [Sections 2, 3.2, and 3.3] (PDF)

EXAM 1 Friday the 27th Deductive logic, the problem of induction, the probability calculus.

Week 6: March 2, 4, 6 Interpretation of Probability Cont. Personalist interpretations and objective chance/propensity interpretations.

Read Hájek, Interpretations of Probability, Stanford Encyclopedia of Philosophy [3.4-end] (PDF), Lewis, A Subjectivists Guide to Objective Chance (PDF)

Week 7: March 9, 11, 13 (9th is DROP DAY) Deductive Approaches to Confirmation

Read Earman & Salmon, The Confirmation of Scientific Hypotheses (excerpts), from *Introduction to the Philosophy of Science* [sections 2.2–2.4]

Week 8: March 16, 18, 20 The Goodman Paradox

Read Chapter 4

Week 9: March 23, 25, 27 Probabilistic Approaches to Confirmation

Read Fitelson, Inductive Logic (PDF) Earman & Salmon, The Confirmation of Scientific Hypotheses (excerpts)

EXAM 2 Friday the 27th - Interpretations of probability, deductive approaches to confirmation theory, the Goodman paradox

Week 10: SPRING BREAK

Week 11: April 6, 8, 10 Bayesian Solutions to problems in Confirmation

Fitelson, The Paradox of Confirmation (PDF)
Sober, A Bayesian Primer on the Grue Problem

Week 12: April 13, 15, 17 Bayesian Solutions to Paradoxes of Confirmation

Read Howson and Urbach, Section on The Ravens Paradox, in Scientific Reasoning: The Bayesian Approach, Vranas, Hempel's Raven Paradox: A Lacuna In The Standard Bayesian Solution

Week 13: April 20, 22, 24 Bayesian Solutions cont. and start Bayesianism and Objectivity

Start John Earman: Bayes or Bust? (ch. 6.1-6.8, 6.14)

Week 14: April 27, 29, May 1 Bayesianism and Objectivity

Read John Earman: Bayes or Bust? (ch. 6.1-6.8, 6.14)

EXAM 3 Friday May 1st. Probabilistic approaches to confirmation, Bayesian solutions to paradoxes of confirmation theory, objectivity and Bayesianism.

Week 15: May 4, 6, 8 Challenges to Bayesian Confirmation Theory

Fitelson, Old Evidence, Logical Omniscience & Bayesianism, Fitelson, "Likelihoodism, Bayesianism, and Relational Confirmation"

Week 16:
FINAL EXAM 3:20-5:20 Wednesday May 13th.