LPS 31: Introduction to Inductive Logic
Spring 2011

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Lecture: TuTh 8:00-9:20 in SSL 228
Office Hours: Tu 9:30-11:30 and by appointment

Teaching Assistant: Skyler Nelson
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Sections: Tu 1:00-1:50 and F 11:00-11:50
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Sections: M 10:00-10:50 and W 9:00-9:50
Office Hours: W 10:00-12:00 and by appointment

Description: This course is an introduction to inductive logic and rational choice. Inductive logic is the study of reasoning under uncertainty—which, after all, is how most of our reasoning is done. Rational choice theory, meanwhile, is the study of how logical inference can be used to inform decision-making. The principal question we will be asking is, how should evidence affect our beliefs and actions? Our basic tool for studying this question will be the probability calculus, and especially Bayes' theorem. We will study how to assign probabilities to possible propositions and how to update those probabilities as we learn new things about the world. Finally, since this is a philosophy course, we will spend some time discussing issues that arise at the foundations of probability theory.

Target: The course is intended primarily for students who have already taken introductory deductive logic, at the level of LPS/Phil 29 and 30, or LPS/Phil 104. Although much of the material is independent of the previous courses in the sequence, I will at times take for granted that students are familiar with basic notions from logic, such as what a logical argument is, when an argument is deductive and when it is inductive, notions of validity, cogency, etc., basic familiarity with sentential and propositional logic, and so on. If you have not taken either the previous courses in the LPS/Phil logic sequence or LPS/Phil 104, Webreg should not have permitted you to enroll. If you think that you should be permitted to take the course anyway, or if you are unsure about whether you are adequately prepared for this course, please contact me during first week and we can discuss your situation.

Expectations: By the end of this course, I will expect you to be able to recognize an inductive argument and to assess its cogency; to be competent in basic probability calculations and their application to decision-making; and to understand how probability theory is related to evidence and rational belief.

Course Website: http://eee.uci.edu/11s/66010

Textbooks:
Required: *Introduction to Probability and Inductive Logic*, by Ian Hacking. (Cambridge University Press, 2001;

ISBN: 9780521775014)
Recommended: *Choice and Chance: An Introduction to Inductive Logic*, by Brian Skyrms. (Wadsworth Publishing, 1999; ISBN: 9780534557379)
Online Supplement: LPS Logic Wiki. Available at http://kleene.ss.uci.edu/lpswiki/index.php/

Grading: Grades will be based on three midterms exams and a cumulative final. Each midterm will be worth 20 points; the final will be worth 40. Additionally, I will assign optional weekly homework problems, which will count for extra credit. These will be due on Wednesdays, in your TA's mailbox. The amount of extra credit will vary from assignment to assignment, but in total, one should expect to be able to get $20 - 25$ extra points by doing homework problems. Sections are optional, but encouraged. Letter grades will be assigned as follows: A+ $\geq 97 >$ A $\geq 93 >$ A- $\geq 90 >$ B+ $\geq 87 >$ B $\geq 83 >$ B- $\geq 80 >$ C+ $\geq 77 >$ C; etc.

Course Schedule: Below is the course schedule.

Meeting	Topic	Reading assignment
Tu 3/29/2011	Course Introduction	
Th 3/31/2011	Logic refresher	Hacking Ch. 1
Tu 4/5/2011	What is inductive logic?	Hacking Ch. 2
Th 4/7/2011	The Gambler's Fallacy	Hacking Ch. 3
Tu 4/12/2011	Basic probability	Hacking Ch. 4
Th 4/14/2011	Conditional probability	Hacking Ch. 5
Tu 4/19/2011	**Exam 1**	
Th 4/21/2011	The probability calculus	Hacking Ch. 6 & Skyrms Ch. 6
Tu 4/26/2011	Bayes' Theorem	Hacking Ch. 7
Th 4/28/2011	Expected value	Hacking Ch. 8
Tu 5/3/2011	Maximizing Expected Value	Hacking Ch. 9
Th 5/5/2011	Decision Under Uncertainty	Hacking Ch. 10
Tu 5/10/2011	**Exam 2**	
Th 5/12/2011	What is probability?	Hacking Ch. 11
Tu 5/17/2011	Several views of probability	Hacking Ch. 12 & Skyrms Ch. 7
Th 5/19/2011	Subjective belief	Hacking Ch. 13
Tu 5/24/2011	Coherence and Dutch books	Hacking Ch. 14
Th 5/26/2011	Evidence and learning	Hacking Ch. 15
Tu 5/31/2011	**Exam 3**	
Th 6/2/2011	The problem of induction	Hacking Chs. 20 & 21
Tu 6/7/2011	**Final Exam**	

Makeup Exams: If you have a valid reason for a makeup exam, such as a medical emergency or death in the family, inform me and your TA as soon as you can. If you are a student athlete or have similar extracurricular commitments that will force you to miss an exam, let me know as soon as you become aware of it. Under no circumstances will I give a makeup exam for a foreseeable conflict that I was not informed of long in advance.

Students with Disabilities: Inform me first week if you will need to take exams through the Disability Service Center. The sooner you notify me, the better that I will be able to accommodate you.

Academic Integrity: UCI has a strict policy on academic dishonesty. Cheating on exams will be reported to the appropriate authorities, with no exceptions. Although you are welcome to collaborate on homework problems, all submitted work must be in your own words. Dishonesty in any capacity in this course will not be tolerated.