PHIL 12: Logic and Decision Making (Spring 2011)

Instructor: Dr. Mitchell Herschbach (mherschb@ucsd.edu)
Office: HSS 8037
Office Hours: Tues 1:00-3:00pm and by appointment

Lecture: Tues & Thurs 11:00am-12:20pm, Solis 104

Course website: http://mechanism.ucsd.edu/~mitch/teaching/s11/phil12/
Inquiry website (course text): http://inquiry.ucsd.edu

Sections	TA	Office	Office Hours
A01 Mon 3-3:50pm Warren Lecture Hall 2207	Nat Jacobs (njacobs@ucsd.edu)	HSS 7054	Thurs 1-3pm
A02 Wed 1-1:50pm Warren Lecture Hall 2113	Nat Jacobs (njacobs@ucsd.edu)	HSS 7054	Thurs 1-3pm
A03 Fri 10-10:50am Cog Sci Building 005	Jeremy Gomer (jgomer@ucsd.edu)	HSS 7059	Fri 11am-12pm

Course Description

Reasoning and decision making are two of the most important activities in which humans engage. But we don't always do so in the best manner. When we don't, the consequences can range from minor inconvenience to catastrophic loss. One of the contexts in which humans have most systematically and most successfully developed their capacities for good reasoning is scientific inquiry. This is where we will turn for guidance. Science is also extremely important to our own decision making as we rely on the results of scientific inquiry. Hence, we will try to understand how science works and how reliable its results are. Some of the questions we will address are:

- What makes for a good piece of reasoning in science?
- Can we ever be absolutely certain of the truth or falsity of a scientific hypothesis?
- How objective is observation? How can we avoid making mistakes in perception?
- What might we learn from systematic observation?
- What can we learn from discovering correlations between variables? How can we avoid being misled by illusory correlations?
- What does it take to establish a causal relationship?
- What are mechanisms, what role do they play in science, and how do scientists discover and reason about them?

Course Objectives

This course will emphasize active engagement in the kinds of reasoning and decision making which scientists use in developing and testing hypotheses, especially through on-line exercises and demonstrations. The goals of the course are for students to understand the logical and statistical principles by which scientific claims are created and evaluated, and to develop a critical appreciation for the methods by which knowledge is acquired in science. You should leave this course with a better ability to distinguish good from poor reasoning and decision making in science and other domains.

Course Materials

1. Inquiry website and printed course reader
The primary course materials are on the course website at http://inquiry.ucsd.edu, developed by Bill Bechtel, Adele Abrahamsen, Carl Craver, and Peter Bradley. Login directions and initial login codes are included in the course reader, which is available at the UCSD bookstore (be sure you buy a new reader—used initial logins cannot be reused). If you have any problems using your login code, contact me as soon as possible.

The modules found on the website include text, animation, and interactive exercises, of which only the text is included in the reader. Some modules have questions to answer at the end. All activity on the site is recorded and logged, including answers to question sets attached to the modules. Completion of the on-line exercises is a requirement of the course.

2. i>clicker student response system
You will also need to purchase an i>clicker transmitter, the student response system used in this class. These "clickers" are available at the UCSD bookstore. Make sure to get an i>clicker and not a different system (e.g., H-ITT or PRS). For more information, visit:
http://mediaservices.ucsd.edu/student-response-system

Course Requirements

For each module on the Inquiry site, students are expected to complete the module and any questions attached to it before attending the class for which it is assigned. Attendance in class and sections is required.

Assessment

1. Web-based exercises (5%): timely completion of the exercises and questions on the Inquiry website. Graded on whether you complete the questions, not the accuracy of your responses.

2. Lecture participation (10%): your "clicker" score will be based on in-class questions scored using the i>clicker student response system. Several times during each class (except the first), I will pose a question (usually a multiple choice question) and ask you to "buzz in" with your answer; the system will automatically record your responses. In order to receive credit for your responses, you will need to register your i>clicker remote online at http://www.iclicker.com/registration within the first week of class. Each question is worth one point. Your clicker score will be the percentage of points earned divided by the maximum possible. Important: you must have your clicker every class period to get these points—no exceptions.

3. Section participation (5%): participation and performance on quizzes in section

4. Short papers (30%): two 1-2 page papers on assigned topics

5. Midterm exam (25%): in-class exam consisting of multiple choice, short answer, and essay questions

6. Final Exam (25%): in-class exam consisting of multiple choice, short answer, and essay questions

For students taking the course pass/no pass, a C- (70%) is the minimum grade for receiving a pass.

Policies

Special Accommodations
Students requesting accommodations and services due to a disability for this course need to provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. OSD Academic Liaisons also need to receive current AFAs. For more information, contact the OSD at (858) 534.4382 (V); (858) 534-9709 (TTY); mailto:osd@ucsd.edu, or http://osd.ucsd.edu.

Academic Integrity
Students are expected to do their own work, as outlined in the UCSD Policy on Integrity of Scholarship:
http://www-senate.ucsd.edu/manual/Appendices/app2.htm

Cheating will not be tolerated, and any student who engages in forbidden conduct will be subjected to the disciplinary process. You are responsible for familiarizing yourself with these policies; ignorance will not be an excuse. If you have any questions about these policies, feel free to contact me.

Deadlines for Assignments
Make-up exams (for midterm and final) or extended deadlines (for the papers) will only be given under the most severe circumstances. Any student who wishes to take a make-up exam or needs an extension must inform me (in person or by email) <u>before the deadline</u>. In order to qualify for a make-up exam or an extension, appropriate evidence of the most severe circumstances must be produced by the student. I will determine, in consultation with the student, what qualifies as appropriate evidence.

Classroom Conduct
Please arrive to class on time. Students should be respectful of their fellow classmates, allowing them to finish before speaking, listening to and respecting classmates' views/opinions. In addition, students must silence all cellular telephones, pagers, and iPods, etc., before entering the classroom. Laptops and other electronic devices may not be used in class, except for lecture note-taking.

Schedule

This schedule is tentative and subject to revision. The up to date version will be on the course website.

The numbered reading assignments are modules on the Inquiry website; the numbering is based on the table of contents in your printed reader. You should complete these, including any attached questions, before the assigned class (although subsequent review is certainly encouraged).

	Day	Topic	Readings
Week 1	Tues 3/29	Introduction: The Inquiry Website and Exemplary Scientific Reasoning	Syllabus
	Thurs 3/31	Elements of science	*1. Argumentation; 1.1. Invitation to Scientific Reasoning; 1.2. Statements: the atoms of reasoning; 1.3. Justification and arguments*
Week 2	Tues 4/5	Valid arguments	*1.4. Some basic valid argument forms*
	Thurs 4/7	Confirmation, falsification, and fallibility	*1.5. Evidential relations; 1.6. The fallible character of human knowledge*
Week 3	Tues 4/12	Observation and categories	*2. Observation; 2.1. Observation and learning to see*
	Thurs 4/14	Categorizing phenomena	*2.2. Categories and taxonomy*
Week 4	Tues 4/19	Observational research	*2.3. Observational research*
	Thurs 4/21	Distributions and samples	*2.4. Variables and measurement*
Week 5	Tues 4/26	**Midterm Exam**	
	Thurs 4/28	Predicting relationships between variables	*3. Correlation; 3.1. Predicting relationships between variables*
Week 6	Tues 5/3	Predicting from correlations	*3.2. When variables are correlated*

	Thurs 5/5	Correlational studies of differences between means	*3.3. When variables are not correlated; 3.4. When groups differ*
Week 7	Tues 5/10	Correlation and causation	*3.5. Correlational studies as tests of causal claims; 3.6. Correlational vs. experimental research*
	Thurs 5/12	Causal explanation and causal reasoning **First paper due**	*4.1. Causal explanation; 4.2. Reasoning about causation*
Week 8	Tues 5/17	Reasoning about and graphing causes	*4.2. Reasoning about causation; 4.3. Causal reasoning with directed graphs*
	Thurs 5/19	Causation and experiments	*4.4. Testing causal claims experimentally*
Week 9	Tues 5/24	Causation when experiments are not possible	*4.5. When randomized experiments are not possible*
	Thurs 5/26	Mechanism and mechanistic explanation **Second paper due**	*5. Mechanism; 5.1. Entities and activities organized to produce a phenomenon*
Week 10	Tues 5/31	Organization and levels of organization	*5.2. Levels of organization within mechanisms*
	Thurs 6/2	Discovering and modeling mechanisms	*5.3. Describing and portraying mechanisms*
	Tues 6/7	**Final Exam 11:30am-2:30pm**	