SCI 101/101A: Outline

Week 1: Presuppositions

Freshman: Introduction to the university and the college. Provide important dates and policies. Review classroom etiquette and college-level expectations. Talk about cell phones, email, building a community, and other's experiences in college.

Science: What is Science? What differentiates Science from other fields of study? Begin talking about what makes for good Science. Discuss the presuppositions that underlie Science. Explore the refutation of Science through the philosophical arguments of the Skeptics. Where does this leave Science?

Discuss the non-contradictory dichotomy between Science and Faith.

Activity: Campus Scavenger Hunt

Week 2: PEL Model I

Freshman: Note taking and the proper way to study

Science: What model underlies scientific inquiry? Continue talking about what makes for good Science. Introduce the PEL model of Presuppositions, Evidence, and Logic. What role does each piece play in the process of scientific inquiry? Can a functional model exist without any of these pieces? What isn't included in this model? Is it necessary?

Activity: Library Exercise in computer lab

Week 3: Deductive Logic I

Freshman: Learning styles

Science: Review the PEL model. Discuss the differences between inductive and deductive logic. Introduction to deductive logic. Discuss the absolute nature of deductive logic, as well as the movement from fact to hypothesis as the direction of deductive logic.

Use the following models: (1) the revolution of the universe around the Earth. (2) General Relativity and the introduction of Dark Matter.

Activity: Check Digits

Week 4: Deductive Logic II

Freshman: Time Management

Science: Review deductive logic. Discuss the role of probability in deductive logic. Introduction to probability. What can probability tell us about the expectation of certain events occurring given the absolute knowledge provided by deductive logic.

Activity: Probability and genetics

Week 5: Deductive Logic III

Freshman: GPA and grade information

Science: Review deductive logic. Discuss common fallacies in deductive logic: ad hominem attacks, assuming the conclusion, denying the argument, begging the question, circular arguments, and others.

Activity: Financial Math

Week 6: Inductive Logic I

Freshman: Discuss road maps for graduation. Discuss issues arising during the advising and registration process.

Science: Introduction to inductive logic. Compare and contrast with deductive logic. Discuss the statistical nature of inductive logic, as well as the movement from collected data to constructed model as the consequence of inductive logic. Can we trust inductive logic? Is the universe that consistent?

Activity:

Week 7: Inductive Logic II

Freshman: Health and stress

Science: Review inductive logic. Discuss the role of statistics in inductive logic. Briefly touch on the philosophical differences in Bayesian and frequentist approaches to statistics. Discuss common fallacies in inductive logic.

Activity: Statistics

Week 8: PEL Model II

Freshman: Academic dishonesty and Judicial Affairs

Science: Review the PEL model and the two types of logic. How do deductive logic and inductive logic work together with the PEL model in Science? Discuss the back-and-forth process of using deductive logic to create hypotheses and using inductive logic to take collected data and create models and evaluate hypotheses. Can we do Science without either type of logic?

Apply the PEL model to personal behavior. Based on personal habits with time management and financial matters, what does inductive logic suggest? What model describes your habits? Based on deductive logic, what are the consequences of your habits? What changes should be made in your lifestyle? What does deductive logic say about the consequences of these changes?

Activity: Personal finances

Week 9: Parsimony

Freshman: Campus Involvement

Science: Is a more complicated model necessarily better? Introduction to predictive and postdictive results. Which one will be of most use to you? Introduction to the concept of parsimony and Ockham's Razor. Discuss examples from Science history.

Activity: Developing a model

Week 10: The Limitations of Science

Freshman: Goal setting

Science: Discuss the limitations of Science both as a way of thought and as a practical basis for exploration of the universe.

Activity:

Week 11: Finals