

PHL 220 Medical Reasoning

University of South Alabama

MEETING INFORMATION

Section 101: MWF 10:10-11:00
Section 103: MWF 11:15-12:05
Classroom: HUMB 136

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Office: HUMB 133
Office Hours: W 12:10-3:10; or by appointment

OBJECTIVES

The broad goals of this course are to increase the effectiveness of your clinical decision making, reduce your chances of diagnostic error, and improve your ability to evaluate clinical research. At the service of these goals are habits of mind the course is designed to exercise: inquisitiveness, intellectual integrity, perseverance, flexibility, fair- and open-mindedness, contextual perspective, respect for clarity and precision, respect for evidence and reasoning, and reflectiveness about your own thinking.

Much more specifically, and with these broad goals in mind, we aim to:

1. Recognize and address common errors in reasoning
2. Notice and analyze assumptions and biases
3. Identify deductive and inductive arguments
4. Assess the quality of reasoning behind arguments
5. Construct good arguments

DESCRIPTION

The course is divided into three modules. In the first, we will discuss reasoning in general and use cognitive science to identify a common sort of thinking error that can lead to misdiagnosis and mistreatment. We will also introduce deductive reasoning and learn how to identify and evaluate deductive arguments—arguments that guarantee the truth of whatever they're arguments for (as long as the reasons they provide are also true).

In the second and third modules, we will turn to inductive reasoning, a type of reasoning at the heart of science and medicine. Inductive reasoning is the best tool we have for uncovering causal relationships, the knowledge of which we need in order to diagnose effectively, develop and choose medical interventions, and predict the course of a disease. Inductive reasoning, however, fails to provide the kind of guarantee of truth we see in deductive reasoning, leaving us with intractable uncertainty. But we will discuss how maximize certainty. We'll apply our insights into inductive reasoning to discovering causal relationships, interpreting the results of diagnostic tests, and decision making in light of uncertainty.

Succeeding in the course requires active participation in team-based, in-class activities, which I assign approximately once a week. In addition, it requires a few hours of out-of-class reading each week.

TEXT

You do not need to purchase a text for this course. I will provide or direct you to all of the assigned material. You will need a computer and internet connection to access them, but otherwise they are free.

However, my technology policy in the class is limited: digital technology may be used in class only for specific exercises. Thus, you will need to use some other method of note-taking and may be required to print some of the readings in order to use them in class. You should budget for both of those.

ASSESSMENT

3 Exams (45% of total grade)

- Each exam is worth 15% of your final grade.
- The first two exams are not cumulative. The third exam (the final) is cumulative.
- There will be a review day and thorough study guide prior to each exam.

3 Portfolios (30% of total grade)

- Each portfolio is worth 10% of your final grade.
- The portfolios merely organize your results of the in-class assignments (ICAs).
 - ICAs are short assignments designed to be completed in class. The deliverables for these assignments vary. Examples include evaluating a set of arguments for validity, deciding what to do in a clinical case and justifying your team's decision in writing or, identifying and describing errors in reasoning.
 - There will be roughly one ICA per week., and I will provide specific instructions for particular ICAs as they arise.
 - ICAs are mostly completed in teams. Your teams last for one module. There are three modules in the course, so you will be on three different teams throughout the semester.
- Portfolios are due the review days before each exam. Exact details on what to turn it will be provided as we go.
- You'll be graded on participation, completion, thoroughness, and clarity.

Science Journalism Review (25% of total grade)

- The Science Journalism Review (SJR) involves using the tools of critical thinking to evaluate a piece of scientific journalism. You will choose your own article to review. Your finished review will be 1-2 pages long. I'll provide more detailed instructions later in the semester. In addition to reviewing a piece of scientific journalism, you will also briefly assess two classmates reviews. Again, more detailed instructions will follow.
- The grade for the SJR is broken down as follows:
 - 20% - Identification of target article by deadline.
 - 60% - Review of target article
 - 20% - Assess two classmates' reviews

GRADING SCHEMA

A	B	C	D	F
90 - 100	80 - 89.9	70 - 79.9	60 - 69.9	0 - 59.9

DEATHTRAPS

Absences

- You have four “sick days”—or class periods you can miss without it directly affecting your grade.
- They are called “sick days” because they operate like sick days in a job: there are a limited number of them, and technically you could use them for whatever you want.
- I do not need a doctors' note/proof that you were sick if you miss.
- Nearly any reason (good or bad) for missing a class period uses a sick day. There is no direct consequence to missing class beyond using up a sick day.
- **HOWEVER: if you miss more than four classes, your final grade will be adjusted down by 2% for every additional class you miss.**
- For example, if your final grade was 91% and you missed five class periods, your adjusted final grade would be 89%. If you missed six class periods, your adjusted final grade would be 87%.

Plagiarizing

- You are responsible for knowing what plagiarism is.
- You are responsible for avoiding it.
- If you plagiarize on an assignment, you will get a zero on the assignment, even if you did not know you were plagiarizing or know what plagiarism is.
- If you plagiarize on an assignment, I will report the fact that you plagiarized to the appropriate authority.

Cheating

- Don't cheat.
- If you cheat, you will get a zero on whatever you cheated on and no opportunity to make it up.
- If you cheat, I will report the fact that you cheated to the appropriate authority.

POLICIES

Honor code: Each student is expected to read, understand, and abide by the university's Code of Student Conduct (which can be found in the USA student handbook).

Technology: Cell phones, laptops, tablets, etc. must be kept out of sight and out of use during class except for when we use them for ICAs. If you require accommodations that require such technology, please talk to me about it.

Accommodations: If you have a condition that interferes with your ability to participate, you may be entitled to accommodations. Please contact the Office of Student Disability Services at disabilityservices@southalabama.edu.

PRELIMINARIES

I. Intro & FAQ

8/21

8/23

FIRST MODULE

2. How good are we at reasoning?

8/26

Read: "Teaching Doctors How to Think" by Richard Senelick, *The Atlantic*

OPTIONAL: "The Causes of Errors in Clinical Reasoning: Cognitive Biases, Knowledge Deficits, and Dual Process Thinking" by Geoffery R. Norman et al., *Academic Medicine*

8/28

Read: "Cognitive Bias Cheat Sheet" by Buster Benson, *Better Humans*

OPTIONAL: "50 Cognitive and Affective Biases in Medicine" by Pat Croskerry

8/30

3. What is an argument?

9/2

NO CLASS (LABOR DAY)

9/4

Watch: "How to Argue – Philosophical Reasoning: Crash Course Philosophy #2" (9:43)

Read: "Validity and Soundness" by Frances Howard-Snyder et al. *Power of Logic*

9/6

Read: "Strength and Cogency" by Frances Howard-Snyder et al., *Power of Logic*

Watch: "Why the Fact Opinion Dichotomy is Harmful" (30:23)

4. What is a good argument?

9/9

OPTIONAL: "I am not sure" by Paul. E. Levin, *Narrative Inquiry in Bioethics*

9/11

Read: "Well-Crafted Arguments" by Frances Howard-Snyder et al., *Power of Logic*

9/13

5. How do you test arguments?

- 9/16 Read: Prof. KT's Crash Course in Categorical Logic
- Read: "Venn Diagrams and Categorical Statements" by Frances Howard-Snyder et al., *Power of Logic*
- 9/18 Read: "Venn Diagrams and Categorical Syllogisms" by Frances Howard-Snyder et al., *Power of Logic*
- 9/20 **NO CLASS (Prof. KT out of town)**

6. Testing arguments, cont. + Exam

- 9/23 ---
- 9/25 **Review**
Study: Study Guide for Exam I
Submit: Portfolio I **Portfolio I**
- 9/27 **Exam (Friday)** **Exam #1**

SECOND MODULE

7. What is induction?

- 9/30 ---
- 10/2 Read: Introductory Paragraph, Sections 19-20 ("Inductive Correctness" and "Induction by Enumeration") in Chapter 3 of Wesley C. Salmon's *Logic*
- NB: I've posted a PDF of Chapter 3 in this week's Resources folder. Although we won't read all of it, we will return to it throughout this module, so I suggest you print the whole thing out this week.*
- Watch: Crash Course "How to Argue – Induction and Abduction"
- 10/4 Read: Sections 21-22 ("Insufficient Statistics" and "Biased Statistics") in Chapter 3 of Salmon's *Logic*
- Read (or Listen): "Research Gaps Leave Doctors Guessing about Treatments for Pregnant Women" by Alison Kodjak, *NPR*
- OPTIONAL: "Are Big Trials Relevant? Researchers Disagree" Lucette Lagnado, *WSJ*

8. What is induction? Cont.

- 10/7 Read: Section 23 ("Statistical Syllogism") in Chapter 3 of Salmon's *Logic*
- Read: "Occam's Error" by Jonathan Howard in *Cognitive Errors and Diagnostic Mistakes: A Case-Based Guide to Critical Thinking in Medicine*
- 10/9 ---
- 10/11 **NO CLASS (Fall Break)**

9. To what extent should we listen to experts?

- 10/14 Read: Section 24 ("Argument from Authority") in Ch. 3 of Salmon's *Logic*
- OPTIONAL: "Why is Measles Back?" by Peter Beinart, *The Atlantic*
- 10/16 Read: "Bandwagon Effect and Authority Bias" by Jonathan Howard in *Cognitive Errors and Diagnostic Mistakes: A Case-Based Guide to Critical Thinking in Medicine*
- 10/18 OPTIONAL (Read or Listen): "When Evidence Says No, but Doctors Say Yes" by David Epstein and Propublica, *The Atlantic*

10. How do we learn about causal relationships?

- 10/21 Watch: Crash Course "Karl Popper, Science, and Pseudoscience"
- OPTIONAL: "Causality and Induction" by R. Paul Thompson and Ross E.G. Upshur in *Philosophy of Medicine: An Introduction*
- 10/23 Read: Section 28 ("Mill's Methods") in Ch. 3 of Salmon's *Logic*
- 10/25 Submit: Link for Target Article for SJR **SJR: Part I**

11. How do we avoid fallacies of causal reasoning?

- 10/28 Read: Section 29 ("Causal Fallacies and Controlled Experiments") in Ch. 3 of Salmon's *Logic*
- 10/30 ---
- 11/01 **Review for Exam**
- Study: Study Guide for Exam 2
- Submit: Portfolio 2 **Portfolio 2**

THIRD MODULE**12 (cont.). What do diagnostic tools tell us?**

11/06 Listen: "Mary Walker - Overdiagnosis and the Definition of Disease" on *Philosophers on Medicine* Podcast hosted by Jonathan Fuller

11/08 ---

13. Diagnosis, cont.

11/11 Read: "Diagnostic tests—assessing accuracy" by Steve Selvin in *The Joy of Statistics*

Read: "The Challenge of Diagnosing Lyme Disease" by Perri Klass, *The New York Times*

OPTIONAL (Watch): "Second Opinions" Episode 2 of *Diagnosis*, Netflix.

11/13 ---

11/15 Submit: Completed review of target article for SJR

SJR: part 2

Read: "File Drawer Effect/Publication Bias" by Jonathan Howard in *Cognitive Errors and Diagnostic Mistakes: A Case-Based Guide to Critical Thinking in Medicine*

14. How do we make decisions in light of uncertainty?

11/18 Read: Excerpt from *Decisive: How to Make Better Choices in Life and Work* by Chip Heath and Dan Heath

OPTIONAL: "Clinical decision-making: coping with uncertainty" by A.F. West and R.R. West in *Postgraduate Medical Journal*

11/20 OPTIONAL: "Why Doctors Still Offer Treatments That May Not Help" by Austin Frakt, *The New York Times*

11/22 ---

15. Making decisions, cont.

11/25

Read: Excerpt from *When Breath Becomes Air* by Paul Kalanithi

SJR: Part 3

Submit: Two peer reviews for SJR

11/27

NO CLASS (Thanksgiving Break)

11/29

NO CLASS (Thanksgiving Break)

16. TBD

12/2

12/4

12/6

Review

Study: Study Guide for Exam 3 (Final)

Submit: Portfolio 3

Portfolio 3

Final Exam (Exam #3)

Exam #3

If you are in PHL 220:101 (typically meet at 10:10), your final is on Monday, December 9 from 10:30-12:30.

If you are in PHL 220103: (typically meet at 11:15), your final is on Wednesday, December 11 from 10:30-12:30.

Note that the syllabus is subject to change. You will always be given advance notice if readings will be added or subtracted or if there will be any alteration in due dates or assignments.