



PSYCHOLOGY 4980-062 SCIENCE AND PSEUDOSCIENCE

11:30 PM – 2:15 PM Tuesday

Fall 2019

Professor:

Matthew T. Tull, Ph.D.

Email: Matthew.Tull@utoledo.edu

Office Location: University Hall 5040C

Office Hours: Tuesday 2:15-4:00PM, Thursday 1:00-4:00PM

Course Website:

<https://blackboard.utdl.edu/>

UNIVERSITY OF TOLEDO COURSE CATALOG DESCRIPTION

Seminar discussion of selected topics in psychology to allow for a more comprehensive treatment than possible in other available courses; or technical laboratory course in neuroanatomical techniques. Topics will vary depending on student demand and availability of instructors.

An overview of concepts and methods for developing critical thinking skills to evaluate and differentiate scientific and pseudoscientific claims.

Credit Hours: 3.00

COURSE DESCRIPTION

“...we are all susceptible to questionable claims, and that science, although hardly a panacea, is ultimately our best bulwark against our own propensities toward irrationality.” (Lilienfeld, 2018).

“Science and Pseudoscience” is an interdisciplinary course where students will be exposed to scientific principles, concepts, and methods that guide the pursuit of knowledge. Students will also be provided with information on how knowledge obtained from science impacts our lives and understanding of the world around us. In learning what constitutes a scientific claim, students will also learn what constitutes an unscientific claim, or pseudoscience. Pseudoscience is a claim, discovery, belief, or practice that is presented as being grounded in the scientific method but does not adhere to that method. In modern society, we are constantly bombarded with pseudoscientific claims through the television, radio, newspaper, social media, books, or even trusted authority figures. Given that we base many of our actions and decisions on information that we receive from these sources, it is important to develop the critical thinking skills to distinguish between claims that are grounded in science or pseudoscience. In this course, students will learn about common errors in thinking and memory that make us susceptible to pseudoscientific claims. We will also explore current controversial topics (e.g., climate change, vaccinations, homeopathic medicine) and critically evaluate evidence for and against these claims.

STUDENT LEARNING OUTCOMES

By the end of this class, you should be able to demonstrate knowledge and understanding representing appropriate breadth and depth in the following areas. These learning objectives will be met through class lectures, assigned readings, class discussion, student class presentations, and completion of a final paper.

1. Describe concepts and principles underlying the scientific method.
2. Develop critical thinking skills.
3. List the features of pseudoscience and how pseudoscientific claims differ from scientific claims.
4. Recognize common errors in thinking (heuristics, confirmation bias, etc.) that make people susceptible to pseudoscience.
5. Analyze the evidence for and against current claims presented as being grounded in the scientific method to determine if they are indeed grounded in science or pseudoscience.
6. Develop the ability to effectively present and defend your ideas through writing and verbal presentation.

PREREQUISITES AND COREQUISITES

None.

REQUIRED TEXTBOOK

Kaufman, A. B., & Kaufman, J. C. (2018). *Pseudoscience: The Conspiracy against Science*. Cambridge, MA: MIT Press.

Additional readings and course materials may be announced in class and posted online. Any required readings will be posted at least two weeks in advance of their due date. Any guest speaker will be announced at least one week prior to visiting the class.

TECHNOLOGY REQUIREMENTS

We will be using an online component for this course, the Blackboard course website (<https://blackboard.utdl.edu>). You will complete daily quizzes via this website. The Blackboard course website is also where any class announcements will be made and where copies of lecture slides will be posted after the lecture has been given. Additional information (syllabus, information on the instructor, information about required assignments) will also be presented on the Blackboard course website. Your grades will be accessible through the Blackboard course website as well.

UNIVERSITY POLICIES

All students at the University of Toledo are expected to read, understand, and follow the academic policies that govern their attendance at the University. These policies include, but are not limited to, academic dishonesty, academic forgiveness, adding and dropping a course, grades and grading, and the missed class policy. Please use the following URL to read a comprehensive list of academic policies that pertain to you in this class and throughout your academic journey: <http://www.utoledo.edu/policies/academic/undergraduate/>
If you have any questions after reading through the policies, please let me know.

Policy Statement on Non-Discrimination on the Basis of Disability (ADA). The University is an equal opportunity educational institution. Please read The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.

Students can find this policy along with other university policies listed by audience on the University Policy webpage (<http://www.utoledo.edu/policies/audience.html/#students>).

Academic Accommodations. The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an accommodations memo from Student Disability Services, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course. For students who have not established affiliation with Student Disability Services and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the Student Disability Services Office (<http://www.utoledo.edu/offices/student-disability-services/>) by calling 419.530.4981 or sending an email to StudentDisability@utoledo.edu.

Academic Dishonesty. Consistent with University Policy, academic dishonesty will not be tolerated. Students are responsible for knowing what constitutes academic dishonesty. If students are uncertain about what constitutes plagiarism or cheating they should seek the instructor's advice. Examples of academic dishonesty include, but are not limited to: 1) Plagiarizing or representing the words, ideas or information of another person as one's own and not offering proper documentation; 2) Giving or receiving, prior to an examination, any unauthorized information concerning the content of that examination; 3) Referring to or displaying any unauthorized materials inside or outside of the examination room during the course of an examination; 4) Communicating during an examination in any manner with any unauthorized person concerning the examination or any part of it; 5) Giving or receiving substantive aid during the course of an examination; 6) Commencing an examination before the stipulated time or continuing to work on an examination after the announced conclusion of the examination period; 7) Taking, converting, concealing, defacing, damaging or destroying any property related to the preparation or completion of assignments, research or examination; 8) Submitting the same written work to fulfill the requirements for more than one course. The full University policy on academic dishonesty may be found at <http://www.utoledo.edu/dl/students/dishonesty.html>

Resources Related to Sexual or Gender-based Violence and Harassment. The University of Toledo cares greatly about the health and well-being of our students, staff, and faculty, and takes all sexual or gender-based violence and harassment very seriously. If you have experienced sexual assault, sexual harassment, intimate partner violence, and/or stalking and want a confidential place to obtain support and information, please contact the Center for Student Advocacy and Wellness on the main campus in Health and Human Services Room 3017. You can call 419.530.2497 during regular business hours and 419.530.3431 for 24-hour assistance from a trained advocate. In-person, walk-in appointments are also available Monday-Thursday from 8:30 a.m. to 5 p.m. The Center for Student Advocacy and Wellness provides free and confidential advocacy and counseling services to students, faculty and staff. The YWCA H.O.P.E. Center also can be accessed as an off-campus confidential resource at 419.241.7273. Faculty, teaching assistants, and other university employees are mandated reporters of any incidents of sexual or gender-based violence or harassment. Thus, any disclosures of sexual or gender-based violence or harassment on or off campus made to faculty or teaching assistants, or other university employees must be forwarded to the Title IX

Coordinator. The Title IX Office will then contact you regarding your rights, your option to participate in the investigation, interim safety measures and/or academic accommodations, and the need to proceed with an investigation (even if none is requested). Your participation in the process is voluntary. You may call 419.530.3152 to file a complaint or visit the following website for more information and resources: <http://www.utoledo.edu/title-ix/>. Policies relating to Title IX can be found at: <http://www.utoledo.edu/title-ix/policies.html>.

ACADEMIC AND SUPPORT SERVICES

The university provides a variety of academic and support services on campus to help you succeed and reach your fullest potential. Whether you need to ask a question, get help with an assignment, seek advice from a counselor, find a job or join a club, UToledo is there for you! Just use the following URLs to find the academic support or service you need:

- Tutoring: <http://www.utoledo.edu/success/lec/>
- Library: <http://www.utoledo.edu/library/>
- Success Coaching: <https://www.utoledo.edu/successcoach/>
- Student Affairs: <http://www.utoledo.edu/studentaffairs/>
- Career Services: <http://www.utoledo.edu/success/career/>

SAFETY AND HEALTH SERVICES FOR UT STUDENTS

In addition to the university policies developed to ensure your health and well-being as a student, there are also a number of on and off campus resources available to support you including a food pantry. Please use the following link to see some additional resources available to you:

- Campus Health and Safety Contacts:
<http://www.utoledo.edu/offices/provost/utc/docs/CampusHealthSafetyContacts.pdf>
- Link to Food Pantry: <http://www.utoledo.edu/studentaffairs/food-pantry/>

COURSE EXPECTATIONS AND GUIDELINES

Class Attendance. It is the responsibility of each student to attend all classes, take all quizzes, and turn in all assignments on time. Attendance will be recorded. You are allowed two free misses over the course of the semester. After that, two points will be deducted from your participation grade. Please do not arrive late to class. Students who arrive 10 minutes or more after the class starts will be counted as absent, unless the student obtained permission from the instructor to arrive late.

Class Etiquette. It is expected that the classroom environment will be peaceful, intellectually stimulating, and respectful. Please respect your fellow classmates, their questions, their responses, and their views and personal attitudes. Some course materials will cover controversial topics, as well as information designed to stimulate thought and assist you in developing critical thinking skills and looking at problems from multiple perspectives. This requires everyone to approach the material with curiosity and an open, unbiased mind. It is important that the classroom is a safe area where ideas and attitudes can be freely expressed without judgment or anger. If you have questions or concerns about this course policy, please see me as soon as possible to discuss.

It is rude and distracting for students to use electronic devices in class (for placing or receiving calls and/or text messages and email); therefore, please refrain from using electronic devices in class (e.g., cell phones, etc.). Cell phone use in class will not be tolerated. Laptops and tablets are allowed for notetaking and taking quizzes. However, if this privilege is abused, these electronic devices will not be allowed. Inappropriate laptop activity includes doing anything beyond note-taking (e.g., checking email, shopping online, working on outside of class assignments, using social media, etc.). I have a no tolerance policy when it comes to abusing this privilege. Therefore, it only takes one person to abuse this privilege for this privilege to be taken away. I will be actively monitoring the classroom for inappropriate laptop activity.

Communication with Instructor. Communication with the instructor is most reliable by email (matthew.tull@utoledo.edu). Please use your Rocket Mail address when emailing the instructor. Most questions can be answered quickly by email, but you can also make an appointment to visit my office or the teaching assistants' offices during office hours. As your instructor, I am here to assist you and commit to responding to emails within 24 hours. Please check the Blackboard course website and your email frequently for announcements about the course. If you are having any difficulty with the course material, it is in your best interest to contact the instructor as soon as possible.

If the grade you receive on an assignment is not what you expected based on the amount of effort that you put into it, please contact me as soon as possible to set up a time to meet. I want you to succeed in this course, and I am here to assist you with your study habits and how to best learn the material for this course.

Extra Credit. Extra credit is not offered for this course. Do not ask for extra credit opportunities.

OVERVIEW OF COURSE GRADE ASSIGNMENTS

Your knowledge of the material covered in the book, supplemental materials, and lectures will be assessed with class participation, weekly short quizzes on the readings, a "Science/Pseudoscience in the News" class presentation, and a final paper assignment.

Participation (20% of your final grade). This class is largely organized around class discussions. Although information will be presented through lectures, I am very interested to hear your thoughts about the material. Therefore, it is expected that all students will be an active participant in class discussions. All students will start with an A for this portion of the final grade, and points will be deducted as participation does not occur.

Weekly Quizzes (40% of your final grade). Given that participation is an essential part of this class, it is critically important that you come to class prepared to discuss the required material. Given this, each class will begin with a brief quiz based on the daily reading assignment. Each quiz will consist of 10 multiple choice and/or brief answer questions. Beginning with the second week of class, there will be 12 total quizzes. Your lowest two quiz grades will be dropped. For this reason, no make-up quizzes will be offered. Quizzes will be delivered through Blackboard. Therefore, please make sure you bring your laptop to class. If you would prefer to take the quiz by hand, please let the instructor know ahead of time so that arrangement can be made.

You can also replace the grade of an additional 2 quizzes by bringing in an example of pseudoscience in the media (e.g., newspaper article, blog, message board, webpage). This example should be accompanied by a brief (one paragraph or ½ page, single-spaced) description of how the example would be considered pseudoscience. There will be a brief

discussion about the example in class. This is a pass/fail assignment. If completed, your lowest quiz grade will be replaced with a 100.

“Science/Pseudoscience in the News” Presentation (20% of your final grade). For this assignment, you are to summarize a recent news item (obtained through a newspaper or magazine article, website, social media, television program, etc.) that involves some kind of claim or discovery. This claim may be a scientific or pseudoscientific claim. Your news item cannot be a topic that is covered during the class. You will be required to turn into the instructor a 2-page summary of the claim and your evaluation of the validity of the claim. If you believe that the claim is grounded in sound scientific methodology, your summary should clearly justify this argument. If you believe that the claim is pseudoscience, then your summary should clearly indicate how you came to this conclusion (i.e., how does it meet the criteria for pseudoscience). You will then briefly present your news item to the class. Other students will ask questions and engage in a discussion about the news item. Your presentation should be 15-20 minutes in length. You are welcome to use any type of media (PowerPoint slides, videos, handouts) with your presentation. You will sign up for a presentation date and time during the first class. You will need to let the instructor know what news item you will be covering at least two weeks prior to your presentation. The presentation will account for 10% of your final grade and the written assignment will account for 10% of your final grade.

Final Paper (20% of your final grade). Each student is required to write one 5-page paper for this course. The paper is worth 20% of your final grade. The purpose of this writing assignment is to assist you in applying what you have learned in the course. It will also give you the opportunity to receive feedback on your writing style and ability. The paper is due on December 10, 2019, by 6:00 PM. Please do not wait until the last minute to do the paper.

The paper will be on one of four topics that will be posted on Blackboard during the second week of class. You will be required to use critical thinking skills to thoroughly evaluate the topic. Specific requirements for each topic will be described on Blackboard. A rubric describing how your grade on the paper is determined will also be presented on Blackboard. Your paper should not exceed 5 pages of text (does not include title page or reference list) double-spaced, 1-inch margins, 12-point Times New Roman font. A physical copy of the paper should be turned in to the instructor before or after class. Emailed papers will not be accepted. The paper should include a title page that includes the paper title, your name, the course name and section number, the instructor's name, and the submission date.

It is expected that you will consult outside sources when you write your papers. These sources are expected to be peer-reviewed sources. You are required to have at least 4 sources cited in the text of your paper that come from peer-reviewed publications. Wikipedia is not a reliable source. It is very important that you do not cite statements that are not your own. Plagiarism will not be tolerated. Make it clear where you obtained the information. Your paper should include a reference section. **Check out this website to learn more about how to cite your references in accordance with the American Psychological Association:**
<https://owl.english.purdue.edu/owl/resource/560/01/>

GRADING

Midterm Grades

Midterm grades are assigned the 8th week of class and are used to assist students with determining their academic standing. Attendance is also recorded during the 8th week to meet state and federal laws regarding financial aid disbursement. Please note, if you are not

attending class it could affect your financial aid (scholarships, grants, loans or Federal Work Study). If you decide you are not going to attend this class (or any other class you have registered for), you must formally withdraw (drop) from the course. You can do this by logging onto the myUT portal, clicking on the "Student" tab, and then under "My Toolkit" click on Register/Drop/Withdraw. Your midterm grade will be calculated based on assignments up until the 8th week of class. This may or may not include the class presentation depending on when it is scheduled.

Your final grade will be determined based on your performance on the following:

Assignment	Total Assigned	% of each	Total Percentage
Participation	---	---	20%
Weekly Quizzes	12	4%	40% (two quizzes dropped)
"Science/Pseudoscience in the News" Summary and Presentation	1	20% (10% Summary and 10% Presentation)	20%
Final Paper	1	20%	20%
Total			100%

GRADING SCALE

This is the grading scale. Final grades will not be rounded up.

A = 92.5 - 100%
 A- = 90 - 92.49%
 B+ = 87.5 - 89.99%
 B = 82.5 - 87.49%
 B- = 80 - 82.49%
 C+ = 77.5 - 79.99%
 C = 72.5 - 77.49%
 C- = 70 - 72.49%
 D+ = 67.5 - 69.99%
 D = 62.5 - 67.49%
 D- = 60 - 62.49%
 F = 59.9% and below

W - if you withdraw from the course after the end of the drop period.

IN - Incomplete grades are only assigned in extraordinary circumstances beyond the student's control and only if the student has completed at least 10 exams with a passing grade. Under no circumstances will a student be allowed to retake an entire course in order to complete this course.

Not Attending - Failure to do assignments and take exams will be reported to the registrar and such non-attendance may affect your financial aid.

TENTATIVE COURSE SCHEDULE

Week	Day	Date	Topic	Readings Due	Assignments Due
1	T	8-27	Introduction to the course; Basic issues in the philosophy of science; schedule class presentations	Syllabus	
2	T	9-3	The nature of science and the scientific method	Kaufman & Kaufman Chapter 2 and 10	Quiz 1
3	T	9-10	Differences between science and pseudoscience; characteristics of pseudoscience	Kaufman & Kaufman Chapter 4	Quiz 2
4	T	9-17	Errors in thinking that underlie pseudoscience I	Kaufman & Kaufman Chapter 3	Quiz 3
5	T	9-24	Errors in thinking that underlie pseudoscience II	Kaufman & Kaufman Chapter 9 and 21	Quiz 4
6	T	10-1	Errors in memory and pseudoscience (false memories, alien abductions, etc.)	Holden & French (2002); Loftus (1997); Newman & Baumeister (1996)	Quiz 5
7	T	10-8	The anti-vaccination movement	Kaufman & Kaufman Chapter 8; Kata (2012)	Quiz 6
8	T	10-15	NO CLASS		
9	T	10-22	Naturopathic and integrative medicine	Kaufman & Kaufman Chapter 6 and 14	Quiz 7
10	T	10-29	Questionable and unsubstantiated psychotherapies	Kaufman & Kaufman Chapter 13; Herbert et al. (2000); Rosen et al. (1998)	Quiz 8
11	T	11-5	Parapsychology and mysticism	Kaufman & Kaufman Chapter 17	Quiz 9
12	T	11-12	Pseudoscience for health and beauty	Kaufman & Kaufman Chapter 5; Moore (2002); Spector (2009)	Quiz 10
13	T	11-19	AIDS denialism	Kaufman & Kaufman Chapter 19; Natrass (2010)	Quiz 11
14	T	11-26	NO CLASS		
15	T	12-3	Climate change denialism	Doran & Zimmerman (2009); Dunlap (2013); Lewandowsky et al. (2015)	Quiz 12
16	T	12-13	Final Paper Due		Quiz 13

READINGS (will be provided on Blackboard)

Doran, P. T., & Zimmerman, M. K. (2009). Examining the scientific consensus on climate change. *Eos, Transactions American Geophysical Union*, 90, 22-23.

Herbert, J. D., Lilienfeld, S. O., Lohr, J. M., Montgomery, R. W., T O'Donohue, W., Rosen, G. M., & Tolin, D. F. (2000). Science and pseudoscience in the development of eye movement desensitization and reprocessing: Implications for clinical psychology. *Clinical Psychology Review*, 20, 945-971.

Holden, K. J., & French, C. C. (2002). Alien abduction experiences: Some clues from neuropsychology and neuropsychiatry. *Cognitive Neuropsychiatry*, 7, 163-178.

Kata, A. (2012). Anti-vaccine activists, Web 2.0, and the postmodern paradigm—An overview of tactics and tropes used online by the anti-vaccination movement. *Vaccine*, 30, 3778-3789.

Lewandowsky, S., Oreskes, N., Risbey, J. S., Newell, B. R., & Smithson, M. (2015). Seepage: Climate change denial and its effect on the scientific community. *Global Environmental Change*, 33, 1-13.

Loftus, E. F. (1997). Creating false memories. *Scientific American*, 277, 70-75.

Moore, A. (2002). The biochemistry of beauty: The science and pseudo-science of beautiful skin. *EMBO Reports*, 3, 714-717.

Nattrass, N. (2010). Still crazy after all these years: The challenge of AIDS denialism for science. *AIDS and Behavior*, 14, 248-251.

Newman, L. S., & Baumeister, R. F. (1996). Toward an explanation of the UFO abduction phenomenon: Hypnotic elaboration, extraterrestrial sadomasochism, and spurious memories. *Psychological Inquiry*, 7, 99-126.

Rosen, G. M., Lohr, J. M., McNally, R. J., & Herbert, J. D. (1998). Power therapies, miraculous claims, and the cures that fail. *Behavioural and Cognitive Psychotherapy*, 26, 99-101.

Spector, R. (2009). Science and pseudoscience in adult nutrition research and practice. *Skeptical Inquirer*, 33, 35-41.

Note: This syllabus may be appended by the instructor if necessary. Students are responsible for any changes made.