

**BAT 200, Skeptical Thinking  
Spring 2017  
Course Syllabus and Calendar**

Course Time: Thursday 3:00pm – 5:50pm

Course Location: Pulliam Hall 119

Instructor Information

Instructor: Ashley Shayter, MS, BCBA, CBIS

Email: ashayter@siu.edu

Office Location: N/A

Office Hours: By appointment

Please don't hesitate to make an appointment to meet with me. I would like everyone to succeed in this course. The outline of this course is not meant to be a mystery, so if something is not clear feel free to contact me.

Course Materials

Readings for this class will consist of chapters from the primary texts, assigned articles, and web sites. Students are expected to have read all assigned readings prior to the specified class.

- Shermer, M. (2010). *Why People Believe Weird Things*. New York, NY: St. Martin's Griffin.
- Singh S. & Ernst, E. (2009). *Trick or Treatment: The Undeniable Facts About Alternative Medicine*. New York, NY: W. W. Norton and Company.
- Bausell, R. B. (2007). *Snake Oil Science: The Truth About Complementary and Alternative Medicine*. New York, NY: Oxford University Press.
- Assigned research articles can be accessed online, from the specific journal website. They will also be placed on D2L.

Course Description

The objective of this course is to provide an overview and examination of the complex nature of the field of science and its shadow sides of pseudoscience and junk science. We will explore how science is conducted, how the media and popular culture hype non-science, and how you can learn to tell the difference between real and fake science. We will also explore the development of scientific evidence as it relates to the science of behavior analysis. This course will be taught through a combination of assigned readings, lecture, discussion, and in-class activities.

Course Goal

The goal of this course is to teach students to become critical evaluators of information, particularly treatments (i.e., is X effective for reducing symptoms...). There is a lot of information available, and it is difficult to understand what information to act on (Is gluten bad for you? Should you avoid it?). It has become challenging to decipher what information is good and what is not. In this course we will go through numerous examples and evaluate the evidence. We will learn to think in terms of how claims of effectiveness can be made (and what they mean). By the way, what is claim? We will also study the impact of new evidence on society, and learn how society responds. Because I want you to learn to evaluate treatments for yourself there will be some emphasis on discussion and presentation of the material. This information will eventually be tied back to Behavior Analysis, which provides a framework for science-based practice for treating people who have disabilities.

Course Objectives

Course objectives will focus on the evaluation of claims you hear in everyday life. The second part of the course will focus on the evaluation of claims made specifically for the effectiveness of treatments (e.g., chiropractic services, acupuncture). After completing the course students should be able to do the following:

1. Evaluate claims heard in day-to-day life and understand how they are tested
2. Learn the subject matter of science, and what science does not test
3. Describe the characteristics of science and pseudoscience
4. Identify when errors in thinking are being made
5. Effectively use available tools to evaluate new claims, and decide between treatments

Grades

Your grade will be calculated based on points earned from quizzes, class participation, alternative medicine presentation, and a final project.

Quizzes (12 @ 20pts each)	240 points
Alternative Medicine Presentation	50 points
Participation (14 @ 5 pts each)	70 points
Final Project	70 points
Total:	430 points

Letter Grade	Points	Percentage
A	387 - 430	90% - 100%
B	344 - 386	80% - 89%
C	301 - 343	70% - 79%
D	258 - 300	60% - 69%
F	Less than 257	0% - 59%

Lectures

Lectures, which will clarify and supplement material in the readings, will precede quizzes.

Points Awarded For:

1. Quizzes (13 total, 12 count towards the final grade)  
 Quizzes will be given **in class** at the end of each class. Quizzes will consist of multiple-choice questions, true/false, and fill-in-the-blank on the materials covered during the current class lecture and from the assigned readings/media you should have completed upon the start of class. Though less likely, material from past readings and lecture can be included. Quizzes include questions from *Why People Believe Weird Things*, *Trick or Treatment: The Undeniable Facts About Alternative Medicine*, *Snake Oil Science*, and additional readings/videos. Quizzes can contain any of the assigned material, but it is more likely that quiz questions will come from provided objectives. Study objectives are available on D2L. These will help you study for the quiz. The lowest quiz grade will be dropped (leaving a total of 13 quizzes contributing to the

final grade). No makeup quizzes will be provided so plan accordingly. Quizzes will be completed in class on your laptop or tablet. They will be done using D2L using a secure browser. (Please download Respondus LockDown Browser in advance. This software works on tablets.). Weekly quizzes encourage students to read the material. There is no quiz on the last week of class. **On the rare occasion a make-up quiz is given, it will only be counted toward a final grade if a score of 14 or more is acquired. Otherwise the quiz will be scored as a zero (0).**

2. Alternative Medicine Presentation

In the book *Trick or Treatment: The Undeniable Facts About Alternative Medicine* the appendix contains ~40 treatments and provides evidence for these treatments (or the lack thereof). You will summarize one of these treatments and the evidence for or against it. This will be in an approximately 3-4 minute presentation, describing the claims of certain treatments. Is there evidence for this treatment? A three page, double-spaced, paper is required as well (your name at the top doesn't count toward the two pages). The student must find some additional material to supplement the paper and presentation. Please look for systematic reviews and meta-analysis and include these because they only review the highest quality studies. As part of your additional material please find a source for and against your treatment. Remember to cite your sources. Blatant grammatical or spelling errors will result in the loss of points. Select a topic from the appendix of *Trick or Treatment: The Undeniable Facts About Alternative Medicine*. This will be done in class so there are no repeat topics. There is one page in the back of the book that describes this treatment in a concise form. This is the outline for your paper.

- A. Describe the claim in detail. What does the alternative treatment look like? When did it begin? What do people who practice this claim say about how it works (mechanism)? What do proponents say that it treats (or causes)? Where would someone hear this claim?
- B. Find evidence regarding whether the treatment works. Are there meta-analyses or systematic reviews? Describe the studies in some detail. DO NOT say there were no studies that evaluated it. Describe the type of study, the participants, the method, and results. Is the treatment due to placebo effect? Does it work for anything (nuance)? Find at least two studies.
- C. Make a summary paragraph about this treatment/claim.
- D. Cite your references in a reference section. In regard to citations, they are required. Do not directly cite material, but rather summarize it then cite it.
- E. You may cite sources, but you may not copy them directly. Summarize them in your own words AND cite the source. Copying a source directly doesn't indicate to me that you understand the material. NEVER COPY or COPY PASTE ANY MATERIAL. Directly using source material will be penalized. This is true for your PowerPoint, as well.

3. Participation (15 opportunities, 14 count toward your grade)

Participation points will be earned by speaking in class, asking questions, participating in discussions, and in-class activities. Participation is required every class period. If you do not participate than you will lose your participation points. The lowest participation score is dropped.

4. FINAL Project

Your task with this project is to explore a “claim of scientific proof” that is not addressed in the course schedule, and evaluate its merits. Select an area that you might have believed was true prior to this course and now have come to doubt its validity. Walk through the means by which common people come to hear about this area of “science”, what evidence is claimed, what evidence stands the test of good science, and what conclusions can be made. Make sure to describe the “costs” of such claims (financial, emotional, psychological, physical) that may be impacted by the claim. You will be required to summarize your investigation in a 5 page paper (your name and references do not count toward the 5 pages), double-spaced (12pt font, times new roman, 1 inch margins), and present a 5 min summary of this project to the class during the last week of class. Blatant grammatical or spelling errors will result in the loss of points. The final project topic is due two weeks before the final presentation.

- A. Select a topic. This topic can be a claim you have heard in the media OR It can be an alternative treatment. Topics could include things like the evaluation of whether diet soda is bad for you. The topic you select cannot be one we have evaluated in class.

- B. Describe the claim in detail. What does the alternative treatment look like? When did it begin? What do people who practice this claim say about how it works (mechanism)? What do proponents say that it treats (or causes)? Where would someone hear this claim?
- C. Find evidence regarding whether the treatment works. Are there meta-analyses or systematic reviews? Describe the studies in some detail. DO NOT say there were no studies that evaluated it. Describe the type of study, the participants, the method, and results. Is the treatment due to placebo effect? Does it work for anything (nuance)? Find at least two studies.
- D. Describe the costs of buying into the treatment or claim. These costs are financial, personal, emotional, or cultural.
- E. You might also note the safety of the treatment/claim.
- F. Make a summary paragraph about this treatment/claim.
- G. Cite your references in a reference section. In regard to citations, they are required. Do not directly cite material, but rather summarize it then cite it.
- H. Turn it into dropbox before the last class (before final's week)
- I. You may cite sources, but you may not copy them directly. Summarize them in your own words AND cite the source. Copying a source directly doesn't indicate to me that you understand the material. NEVER COPY or COPY PASTE ANY MATERIAL. Directly using source material will be penalized. This is true for your PowerPoint, as well.

### Checking your Email

Some assignments or modifications to assignments may come through email, therefore as part of the class you are required to check your email on at least five (5) different days of the week.

### Recommended steps to get an "A"

1. Read Chapters, completing reading objectives as you read.
  - a. Think about the material you read
  - b. Write down discussion questions for class
2. Read additional material and watch videos
3. Study objectives prior to class in preparation for the quiz
4. Be ready to discuss content in class (bring your discussion questions)

### Students with Disabilities

Support for Students with Disabilities. If you think you need an accommodation for a disability, please let me know at your earliest convenience and register with Disability Support services (618-453-5738; DSSsiu@siu.edu; <http://disabilityservices.siu.edu/>). Some aspects of this course, the assignments, and the way the course is usually taught may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with Disability Support Services to help us determine appropriate academic accommodations. Any information you provide is private and confidential and will be treated as such.

### Academic Dishonesty

Each student is responsible for making himself or herself aware of the policies and procedures in the Graduate Catalog (see [policies.siu.edu/\\_common/documents/StudentConductCode.pdf](http://policies.siu.edu/_common/documents/StudentConductCode.pdf)) that pertains to Acts of Academic Dishonesty. These policies cover such acts as plagiarism, preparing work for another student, cheating by any method or means, falsifying or manufacturing data, furnishing false information to a university official relative to academic matters, and soliciting, aiding, concealing, or attempting conduct in violation of this code. The student is also responsible for making himself or herself aware of the procedures applicable to cases of academic dishonesty as outlined in the Graduate Catalog, including jurisdiction at the department or college level, informal resolution, and formal disciplinary measures. A student must consult with the instructor if he or she has questions pertaining to academic dishonesty prior to the submission of an assignment or test.

Electronics Etiquette

The rule is very straight forward: No cell phones or other electronics may be used during lecture. At the first warning participation points will be lost for that class period. \*\*\*\*\* At the second warning twenty points will be automatically deducted from a student's grade for using a laptop, ipad, or cell phone. \*\*\*\*\*

Laptops and tablets will be used for taking quizzes.

Grade Change Procedures

According to SIU policy, grades given at the end of a course are final and may not be changed by additional work or submitting additional materials. When work is completed for a course in which an INC grade has been given, instructors notify the Registrar's Office of that fact, along with the final grade to be given, by processing a Grade Change Card through the academic dean's office. Similarly, if the original grade that was submitted was done in error, a Grade Change Card should be processed.

Emergency Procedures.

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on the BERT's website at [www.bert.siu.edu](http://www.bert.siu.edu), Department of Public Safety's website [www.dps.siu.edu](http://www.dps.siu.edu) (disaster drop down) and in the Emergency Response Guidelines pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.

Things to Keep in Mind:

- If you are having difficulty with this material, contact the course instructor or teaching assistant as soon as possible.
- If you wish to drop this course for any reason, the Graduate School has a final date that you can do this. It is your responsibility to drop by the date designated by the Graduate School. See <http://registrar.siu.edu/calendars/index.html>
- A grade of Incomplete will be given only under the conditions specified in the Graduate School catalog. This generally refers to situations involving emergencies or unusual family circumstances. It does not pertain to a student who is failing the course. See <http://registrar.siu.edu/grades/incomplete.html>
- This syllabus is subject to modification to correct errors. The instructor reserves the right to make additions or deletions at any time as he sees fit.

## Class Schedule

TT: Trick or Treatment

SOS: Snake Oil Science

<b>Date</b>	<b>Topics</b>	<b>Quiz</b>	<b>Text book reading</b>	<b>Other Assigned Readings or Media</b>
WEEK 1: 1/19	Introduction to the class  Thinking about the claims you hear			

	<p>What are the costs of believing incorrect claims?</p> <p>Science deals with the physical world around us</p> <p>Introduction to books, and Shermer</p>			
<p>WEEK 2: 1/26</p>	<p>Science and Pseudoscience</p> <p>How does society respond to new findings? (Surgeon general’s report on cigarette smoking, 1964; Lead in gasoline – NHANES progress)</p> <p>Benefits of science in society</p>	<p>1</p>	<p>TT: Introduction &amp; 1. How do you determine truth?</p> <p>Shermer: Prologue – Next on Oprah 1. I Am Therefore I Think</p>	<p><a href="http://www.surgeongeneral.gov/library/reports/50-years-of-progress/fact-sheet.html">http://www.surgeongeneral.gov/library/reports/50-years-of-progress/fact-sheet.html</a></p>
<p>WEEK 3: 2/2</p>	<p>Pseudoscience Facilitated Communication</p> <p>Etiquette of Being Skeptical</p> <p>National institutes of Health</p> <p>Why do people seek alternative medicine?</p>	<p>2</p>	<p>Bad Medicine: Introduction</p> <p>SOS Introduction</p> <p>SOS Ch. 1: The Rise of Complementary ...</p>	<p><a href="https://en.wikipedia.org/wiki/Facilitated_communication#Critics_of_Facilitated_Communication">https://en.wikipedia.org/wiki/Facilitated_communication#Critics_of_Facilitated_Communication</a></p>
<p>WEEK 4: 2/9</p>	<p>Science for the advancement of public health and corporate fraud: Were cigarettes safe? Fraud part 2: “Light cigarettes”</p>	<p>3</p>	<p>Bad Medicine: Ch. 1: The Hippocratic Tradition</p>	<p>The truth about tobacco in their own words: <a href="http://www.who.int/tobacco/media/en/TobaccoExplained.pdf">http://www.who.int/tobacco/media/en/TobaccoExplained.pdf</a></p>
<p>WEEK 5: 2/16</p>	<p>Improving the health of the American people</p> <p>Health care</p>	<p>4</p>	<p>Shermer Ch. 6: Abducted</p> <p>Bad Medicine: Ch. 15: Doll, Bradford Hill, and Lung Cancer</p>	<p>CLOSE ENCOUNTERS OF THE FACIAL KIND: Are UFO Alien Faces an Inborn Facial Recognition Template? <i>Frederick V. Malmstrom</i> <a href="http://www.skeptic.com/reading_room/close-encounters-of-the-facial-kind/">http://www.skeptic.com/reading_room/close-encounters-of-the-facial-kind/</a></p> <p>Schroeder, S. A. (2007). We can do better—improving the health of the American people. <i>New England Journal of Medicine</i>, 357(12), 1221-1228.</p>

WEEK 6: 2/23	Science and Politics: Tests of educational practices in California  Pseudohistory	5	Shermer: 13. Who Says the Holocaust...  Shermer: 14. How Do We Know The Holocaust Happened?	
WEEK 7: 3/2	Debates on Science Autism Treatments: Gluten free diets, sensory integration, music therapy  Anecdotes, case studies, control groups, experimental designs	6		National Autism Center Standards Project  <a href="http://www.nationalautismcenter.org/resources/">http://www.nationalautismcenter.org/resources/</a>  Download “Findings and Conclusions: National Standards Project Phase 2” Read: Introduction, Chapter 1, Chapter 3, Chapter 4, Chapter 5  <b>Class Activity:</b> Describe one evidence-based practice and one practice that doesn't have evidence
WEEK 8: 3/9	<b>Class Presentations: Alternative medicine presentation #1</b>	7	TT: Appendix (pick one for class presentation)  SOS Ch. 2: A brief history of placebos	
WEEK 9: 3/16	<b>SPRING BREAK – NO CLASS</b>			
WEEK 10: 3/23	Acupuncture  Examining Claims in the Media (Salsa vs. Ketchup; Food restrictions and allergies: GMO, gluten, bottled water)	8	TT: The Truth About Acupuncture  SOS Ch. 3: Natural Impediments to Making Valid Inferences	
WEEK 11: 3/30	Alternative medicine - Homeopathy	9	TT: The Truth About Homeopathy	
WEEK 12: 4/6	Chiropractic Medicine	10	TT: The Truth About Chiropractic Medicine	

<p>WEEK 13: 4/13</p>	<p>Science in Popular health today: Vaccinations, diet soda (battle?)</p>	<p>11</p>	<p>TT: The Truth About Herbal Medicine</p>	
<p>4/20</p>	<p>Who is the expert? Evidence-based practices.  How do you decide in the face of information overload?  Limits to science?!  Final Project Topic DUE.</p>	<p>12</p>	<p>TT: Does the Truth Matter?  SOS Ch. 4: Impediments that prevent physicians...</p>	
<p>WEEK 14: 4/27</p>	<p>Impediments in thinking How do we explain the placebo effect?</p>	<p>13</p>	<p>SOS Ch. 5: Impediments that prevent poorly trained scientists...  SOS Ch 6: Why randomized control groups...  SOS Ch. 10: A biochemical explanation for the placebo...</p>	<p>Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., &amp; Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. <i>Exceptional Children</i>, 71(2), 165-179.</p>
<p>WEEK 15: 5/4</p>	<p><b>Last week of class – FINAL PROJECT PRESENTATION DUE</b></p>			
<p>Finals Week 5/11</p>	<p><b>FINAL PROJECT WRITE-UP DUE by 6pm</b></p>			

## BCaBA Undergraduate Syllabus Addendum

Students earning a Bachelor’s degree in Behavior Analysis and Therapy have the opportunity to fulfill, in part, the requirements for becoming a Board Certified Assistant Behavior Analysis® (BCaBA®). The BCaBA is an undergraduate-level certification in behavior analysis. Professionals who are certified at the BCaBA level may not practice independently, but must be supervised by someone certified at the BCBA/BCBA-D level. In addition, BCaBAs can supervise the work of Registered Behavior Technicians, and others who implement behavior-analytic interventions. Obtaining certification as a BCaBA improves job applicants’ eligibility and qualification for many positions in the field of behavior analysis. Requirements for the BCaBA are outlined in the table below.

<b>Requirement</b>	<b>Description</b>	<b>Fulfilled by completion of degree requirements for a Bachelor’s in Behavior Analysis and Therapy</b>
Degree	Applicants must possess a minimum of a bachelor’s degree from a qualifying accredited institution. The bachelor’s degree may be in any discipline.	Yes
Coursework	Coursework must come from a qualifying accredited institution and cover the required content outlined in the BACB’s Fourth Edition Task List and Course Content Allocation documents. Only courses where the applicant was formally enrolled and earned a passing grade (“C” or better for graded courses) are acceptable.	Yes
Experience	Applicants must complete 1000 hours of supervised independent fieldwork that fully complies with all of the current BACB Experience Standards.  For more information, visit: <a href="http://bacb.com/wp-content/uploads/2015/08/150824-experience-standards-english.pdf">http://bacb.com/wp-content/uploads/2015/08/150824-experience-standards-english.pdf</a>	No
Examination	Applicants must take and pass the BCaBA examination. Authorization to take the exam is only provided to applicants who have submitted a complete exam application to the BACB, including all documentation necessary to demonstrate that they have met all of the criteria above.  For more information, visit: <a href="http://bacb.com/examination-information/">http://bacb.com/examination-information/</a>	No

As outlined in the table above, the degree you receive and the courses you complete as part of the degree requirements for a Bachelor’s in Behavior Analysis and Therapy will be accepted by the Behavior Analyst Certification Board. However, the experience hours required to sit for the examination are not provided by participation in this program. In order to obtain these experience hours, an applicant must seek out an external site and supervisor. These experience hours may be obtained during or following completion of the program (see the BACB Experience Standards). In addition, the Behavior Analysis and Therapy program does not administer the examination; an applicant must first apply to take this exam through the BACB (fees apply) and take the exam through Pearson VUE (fees apply).