



Medical quacks started peddling questionable remedies during “medicine shows” in Europe during the Renaissance (starting in the 15th century). Picture credit:

<https://web2.ph.utexas.edu/~coker2/index.files/quack.shtml>

Medical quackery and pseudoscience

Biology 4010 | Summer 2022

Instructor D. Law

Contact info

- Office: OA 3004 (on the Orillia campus)
- Email: dlaw@lakeheadu.ca
- Office hour: No set office hour. Email me to set up a Zoom meeting.

Please use the lakeheadu.ca email address above to contact me, not the email within D2L. I will check my email daily Monday to Friday, and will try to respond to your questions as quickly as possible during those days.

Class info

- The course runs for 6 weeks: Monday, July 4 to Sunday, Aug 14, 2022 .
- All material is posted on MyInfo/D2L; check there for the latest course updates and information.
- Biology 4010 is an asynchronous web course and does not have any “live” content. This means that you can proceed through the material at your own pace, keeping in mind that there is an assignment due every week.

Calendar description

(<https://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&topicgroupid=31367&entitytype=CID&entityid=70945&loaduserredits=True>)

Biology 4010 | Medical Quackery and Pseudoscience

- *Description:* The rise of medical quacks and charlatans and their distortion of real science to exploit medical and biological research, particularly from the 19th to the 21st centuries. Philosophy of science; development of the scientific method; elements of pseudoscience; examples of pseudoscience throughout history; tools for medical and scientific literacy.
- *Credit Weight:* 0.5
- *Offering:* 3-0; or 3-0
- *Course Classification(s):* Type C: Engineering, Mathematical and Natural Sciences

Things to read

There is no course textbook. I will post videos and readings by week under **Content** in D2L. Course material is derived mainly from the books below.

Title	Author	Year	Publisher	ISBN
<i>Quackery: A Brief History of the Worst Ways to Cure Everything</i> https://www.goodreads.com/book/show/33572516-quackery	Lydia Kang and Nate Pedersen	2017	Workman Publishing	978076118981
<i>The Sawbones Book: The Hilarious, Horrifying Road to Modern Medicine: Revised and Updated For 2020</i> https://www.goodreads.com/book/show/54482249-the-sawbones-book?ac=1&from_search=true&qid=x6lBQ6SzqD&rank=2	Sydnee McElroy, Justin McElroy, Teylor Smirl	2020	Weldon Owen	9781681886510
<i>Bad Science</i> https://en.wikipedia.org/wiki/Bad_Pharma	Ben Goldacre	2011	Emblem/M&S	978-0-7710-3579-1
<i>Bad Pharma</i> https://en.wikipedia.org/wiki/Bad_Pharma	Ben Goldacre	2012	Signal/M&S	978-0-7710-3629-3
<i>The Quack Doctor: Historical remedies for all your ills</i> https://www.goodreads.com/book/show/17674644-the-quack-doctor	Caroline Rance	2013	The History Press	978-0-7524-8773-1
<i>Dr. Joe's Science, Sense and Nonsense: 61 nourishing, healthy, bunk-free commentaries on the chemistry that affects us all</i> https://www.goodreads.com/book/show/7421984-science-sense-nonsense	Joe Schwarcz	2011	Anchor Canada	978-0-385-66605-3
<i>Making Modern Science: a Historical Survey</i> https://www.goodreads.com/book/show/1137506.Making_Modern_Science?from_search=true&from_srp=true&qid=hlO5XC0Oz7&rank=1	Peter J. Bowler and Iwan Rhys Morus	2005	The University of Chicago Press	978-0-226-06861-9
<i>This Is Biology: The Science of the</i>	Ernst	1997	Belknap/	0-674-884

Living World https://www.goodreads.com/book/show/723584.This_is_Biology	Mayr		Harvard	69-8
<i>The Growth of Biological Thought: Diversity, Evolution, and Inheritance</i> https://www.goodreads.com/book/show/723581.The_Growth_of_Biological_Thought?from_search=true&from_srp=true&qid=Oqv5Nht4KW&rank=1	Ernst Mayr	1988	Belknap/ Harvard	0-674-364 46-5

Learning objectives

At the end of this course, you should be able to:

- Distinguish science-based and non-science-based approaches to understand links between medicine and human health.
- Recognize how medical research builds on previous knowledge by conducting experiments to answer questions.
- Know the names and backgrounds of key historical figures in medicine and quackery.
- Recognize how medical charlatans exploit scientific ignorance to sell their products.
- Conduct a respectful, informed discussion about the history of medical quackery and pseudoscience with your peers.

Deliverables and marking scheme

The deliverables for the course are 6 assignments and 6 weekly quizzes. You have 7 days to review and complete the week's work by Sunday at the end of the week, as follows.

You'll notice that the marks are split 60:40 assignments:quizzes. This emphasizes the importance of showing me your personal views in the assignments and practicing your writing and oral presentation skills.

Week	Due date (Thurs. at 11:59 PM)	Description of deliverables	Weight (% of final mark)
1	July 10	Video #1: History and philosophy of the scientific method	10
		Quiz #1	6.67
2	July 17	Written discussion forum post #1	10
		Quiz #2	6.67
3	July 24	Written assignment #1: Covid-19 and pseudoscience	10
		Quiz #3	6.67
4	July 31	Video #2: video discussion forum	10
		Quiz #4	6.67
5	August 7	Written discussion forum post #2	10
		Quiz #5	6.67
6	August 14	Written assignment #2: What have we learned?	10
		Quiz #6	6.67
Total marks			100

1. Video assignments

There are 2 video assignments during the course. Submitting an assignment in an alternative format will let you practice a different way of showcasing your knowledge of the material in the course. It will also let you practice giving oral presentations in a friendly forum.

Access the assignments and their details/instructions in D2L at **Content > Week x > Video assignment #y**.

- Task #1: Video assignment #1 (due July 10, at end of week 1).
- Task #4: Video assignment #2 (due July 31, at end of week 4).

2. Discussion forums

Discussion forums are an important part of online classes, because other than meetings you schedule with me, there is no face-to-face time with your prof like there is in a classroom-based course.

My goal with the discussion forums is to demonstrate to you that participating helps you understand the course content, but more importantly deepens your learning experience and sharpens your critical thinking skills.

For you to receive discussion participation marks, you must participate regularly with thoughtful posts. For each of the 2 written discussion forums during the course, I will post specific instructions, such as “post one reply to other posts to obtain your participation marks for this forum.”

For all discussion forums, I will post at least 3 discussion topics. One student may reply directly to each of my original questions; there is thus an advantage to posting early. **Further posts must be formatted as replies to those student posts and not directly as replies to my original post.** This is to encourage your (1) deep thought about the subject, (2) consideration of other students’ points of view in your reply, and (3) formatting of discussion topics like a conversation (often one that does not have one right answer) rather than an information download. Thus, **other than the first reply to my original topics, further direct replies to the original topics will not count as posts towards your mark for that forum.**

Note that I will also contribute to the forums, often to try to clarify arguments and prod

further thought and replies. I encourage you to reply to my posts... I will be respectful of your point of view.

How do you contribute effectively to discussion forums? Follow these discussion guidelines (from Debbie Morrison's *Online Learning Insights*

(<https://onlinelearninginsights.wordpress.com/2012/06/22/how-to-get-students-to-participate-in-online-discussions/>) for some hints:

- Use a subject line that relates to your post; this will help create interest and focus for the discussion.
- Write clearly and with expression. Communicating online requires careful and concise writing, but also allows your personality to come through. Though humour is effective and at times relevant in discussion, be sure to avoid sarcasm, which does not translate well online.
- Be supportive, considerate and constructive when replying to your classmates. Do not use jargon, slang or inappropriate language. If you disagree with a classmate, please respond in a respectful and tactful manner. Any posts that I deem inappropriate will be removed from the discussion board.
- Focus on the topic, relating any class readings and materials from the current module in your post (as applicable).
- Proofread and review your response before hitting the submit button.
- Participate regularly. Improve your learning by being an active and engaged student. Follow and participate in the assigned discussion throughout the module, logging on at least every couple of days while reading and participating in forums as assigned in the module.

3. Written assignments

These are between **two and three double spaced pages long**. Provide cited sources for your statements. I am looking for a well-researched review that demonstrates that you have sought out multiple sources to support your statements and that you've thought about the material we've covered in previous weeks.

Access the assignments and their details/instructions in D2L at **Content > Week x > Written assignment #y**.

- Task #3: Written assignment #1 (due July 24, at the end of week 3).
- Task #6: Written assignment #2 (due August 14, at the end of week 6).

4. Quizzes

You will write a 10-minute 10-question multiple choice quiz in D2L each week. These test your knowledge of all of the week's material. As long as you complete the readings, watch the videos and take notes on these, you will have what you need to do well. Quizzes on the current week's topics are available during that entire week.

Schedule

The material in this class will be covered in half the usual time of a F or W term 0.5-FCE course: 6 weeks instead of 12. This means that you will have to devote at least twice as much time per week to reading and thinking about the material than for a F or W course.

I'll post relevant material in **D2L > Content** as I develop it, at least 7 days prior to the due date for assignments. The general topics for each week are:

Week 1: July 4 – 10

- The scientific method: history and development
- Defining science

Week 2: July 11 – 17

- Defining pseudoscience and quackery
- The origins and history of medical quackery
- Pseudoscience versus science

Week 3: July 18 – 24

- 19th and early 20th century quackery, part 1

Week 4: July 25 – 31

- 19th and early 20th century quackery, part 2

Week 5: August 1 – 7

- Good vs. bad experimental design
- The value of independent and industry-sponsored research

Week 6: August 8 – 14

- Pseudoscience and quackery in the Internet age
- Meta-analysis and drug development

Course improvement

It's important to me to continuously improve my courses, so I value student feedback. As such, below are some data from the Student Feedback on Teaching survey from 2020S.

My average score for the 23 questions was 4.58 / 5 (standard deviation +/- 0.26; number of survey participants = 8).

Below are all SFT participants' answers to "What suggestions do you have for improving the course?" (number of survey participants = 4). My action items for the 2022A term are in italics.

- I think it is important to demonstrate the rationale which supports pseudoscience. Many of the students taking the course have likely been immersed in science for years, so it isn't always obvious why people choose to deviate from modern science and medicine in favour of alternative methods. *I have included more background on the origins of medical pseudoscience this year. Short answer: it's been around a long time.*
- I wasn't a fan of all the group discussions. With that being said the written discussions were a little overwhelming, the video ones were an easier way to hear what others had to say without reading large overwhelming amounts of text. *I think it's important to think about biological ideas and practice scientific writing skills, so I've kept the written discussion posts and written assignments. Writing about biology is also a degree-level outcome for HBSc Biology and APLS students, so I'm obligated to include writing opportunities in all of my courses.*
- My only complaint is this course wasn't longer! With a full-semester course I can only imagine how many other topics could be covered and I really hope Lakehead continues to offer this course. I really enjoyed it! *Not this year, sorry :).*
- Return marks quicker. Feedback was good but not timely. Waiting 3 weeks to get marks back from an assignment in a 6 week course is too long of a wait. Suggest returning marks within a week so students can get feedback prior to doing the following week's assignment. *I will try to mark all deliverables within 1 week of the submission date.*

Statement on academic dishonesty

Lakehead has a **Student Code of Conduct – Academic Integrity**

(<https://www.lakeheadu.ca/students/student-life/student-conduct/academic-integrity/node/51239>). All students in this course should read the Code and become familiar with it.

In summary, the penalty for plagiarism or cheating on any part of this or any other course is zero for the work where the student is caught. Serious or repeated plagiarism, including cheating on an examination or test, will result in a mark of zero for the course and may result in expulsion from the University.

For the purposes of this course, there are two places where cheating may occur:

1. submitting written work that you did not research and write, and
2. participating in a discussion forum under any name other than your own.

Academic dishonesty for any of these areas will result in a mark of **zero** for the work concerned. Rest assured that I will take **every precaution** to ensure that potential cheaters are caught and subjected to the appropriate penalty.