



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 fake science

Biology 4610 | Spring 2020

Instructor D. Law

Contact info

- Office: OA 3004 (on the Orillia campus)
- Email: dlaw@lakeheadu.ca
- Office hour: Mondays 8:30 to 9:30 AM. At that time you can meet with me live via Google Meet via a prearranged appointment via email.

You can also make an appointment for a mutually agreeable meeting time with me via email.

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

All material is posted on MyInfo/D2L; check there for the latest course updates and information. Biology 4610 is an asynchronous web course and does not have any “live” content.

Calendar description

(<http://csdc.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&topicgroupid=25226&entitytype=CID&entityid=57969&loadusercredits=True>)

Biology 4610 Biology Tutorial I

- *Description:* Topics to be arranged to suit student specialization. The student will present his/her work at a Biology Department seminar. Students should consult the Department of Biology, and specific faculty members, for course availability.
- *Credit Weight:* 0.5
- *Special Topic:* Yes
- *Prerequisite(s):* none
- *Notes:* May only be taken with the written consent of the instructor and the Chair of the Department.
- *Course Classification(s):* Type C: Engineering, Mathematical and Natural Sciences

The above description is a generic placeholder for year 4 biology courses that don't have a regular calendar entry. This is the first time this course is being offered. The actual course description is below:

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.

Textbook

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>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=hI05XC00z7&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 Living World</i> https://www.goodreads.com/book/show/723584.This_is_Biology	Ernst Mayr	1997	Belknap/Harvard	0-674-88469-8
<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	0-674-36446-5

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.

Marking scheme

The deliverables for the course are 6 assignments. This written or video work is due every 7 days, as follows. There is no final test.

Assignment number	Assignment description	Due date (Thursdays at 11:59 PM)	Weight (% of final mark)
1	Video #1: History and philosophy of the scientific method	May 7	15
2	Discussion forum post #1	May 14	15
3	Written assignment #1: Covid-19 and pseudoscience	May 21	20
4	Video #2: video discussion forum	May 28	15
5	Discussion forum post #2	June 4	15
6	Written assignment #2: What have we learned?	June 11	20
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 either

- in **Content > Week x > Video assignment #y**, or
- under **Other Tools > Video Assignments**.

Use either Chrome or Firefox (not Safari) to ensure that the Video Assignment tool works correctly.

Have fun with these.

Task #1: History and philosophy of the scientific method (due May 7)

Task #4: Video discussion forum (due May 28)

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 two replies 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.
- Keep your post focused 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. Successful students 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.

Task #3: Covid-19 and pseudoscience (due May 21).

Medicine may be both the most rapidly developing field of science and one that is most vulnerable to the influence of pseudoscience. In this assignment, find a pseudoscientific theory about the Covid-19 pandemic, use the tools of the scientific method to discuss why it is pseudoscientific, and discuss the current state of the art around your idea if you were to approach it using a truly scientific approach. Ideas abound every day in the media for this, but a few are listed below. Note that some of these may be more supported by scientific evidence than others; it's up to you to find out which and comment appropriately.

- The March-April anti-lockdown rants from a U of Saskatchewan biology professor (<https://www.cbc.ca/news/canada/saskatchewan/u-of-r-biology-prof-draws-ire-of-sask-scientists-1.5541748>)
- The use of the anti-malaria drug chloroquine to treat Covid-19 infection (<https://www.independent.co.uk/news/world/americas/coronavirus-trump-malaria-drug-hydroxychloroquine-chloroquine-prescriptions-a9484681.html>)
- The debate over the usefulness of wearing masks in public (<https://www.cbc.ca/news/coronavirus-canada-masks-mandatory-1.5544396>)
- The origin theory of the virus in live animal markets in Wuhan (<https://www.mcgill.ca/oss/article/health-pseudoscience/nonsense-about-coronavirus-goes-viral>)
- The susceptibility of doctors to being swayed by pseudoscientific Covid treatments (<https://slate.com/technology/2020/04/coronavirus-research-hydroxychloroquine-remdesivir-studies.html>)

Task #6: What have we learned? (due June 11). I will post details on this in D2L at least 2 weeks before the due date.

Schedule

The material in this class will be covered in half the usual time of a F or W term 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 0.5-FCE course.

This is the first time I'm offering this course, so the list of weekly material we'll cover below is currently vague. I will post relevant material in **D2L > Content** as I develop it, at least 7 days prior to the due date for assignments.

Week 1: May 1 – 7

- The scientific method: history and development
- Defining science

Week 2: May 8 – 14

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

Week 3: May 15 – 21

- 19th and early 20th century quackery

Week 4: May 22 – 28

- Case study: Covid-19 and quackery

Week 5: May 29 – June 4

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

Week 6: June 5 – 11

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

Statement on academic dishonesty

Lakehead has a new **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 in particular two places where cheating may occur:

- (a) submitting written work that you did not research and write, and
- (b) 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 the course instructor will take **every precaution** to ensure that potential cheaters are caught and subjected to the appropriate penalty.