



BIOM*3210 Critical Thinking in the Health Sciences

Fall 2021

Section(s): 01

Department of Biomedical Sciences

Credit Weight: 0.50

Version 2.00 - September 02, 2021

1 Course Details

1.1 Calendar Description

This course will explore a variety of issues related to the scientific ideals and practical realities of health sciences research and its clinical applications. Topics will include critical thinking, critical appraisal of the medical literature, the principles of evidence based medicine, and selected issues related to scientific integrity.

Pre-Requisites: 7.50 credits including (1 of BIOL*1070, BIOL*1080, BIOL*1090)

Restrictions: BIOM*4210

1.2 Course Description

Systematic assessments of the quality of published clinical research typically indicate that only about 20-30% of randomized controlled trials (RCTs) are free of important errors, and that a similar proportion are highly flawed and misleading. It is therefore important that the graduates of healthcare programs be equipped with skills to assess RCT quality prior to incorporating their findings into clinical practice. Unfortunately, professional programs and most undergraduate and graduate programs provide limited education on how to evaluate these studies, and as a result many physicians, veterinarians, dentists, and other healthcare providers lack the ability to recognize whether a trial they read is relatively sound or erroneous. The good news is that you don't need to be a statistician or trial design expert to be able to detect many of the common errors in the medical literature. By the end of this course, you will have markedly improved your ability to distinguish the good from the bad.

Even when good scientific evidence has been identified, it is not necessarily used to guide clinical decisions; the information may not be considered at all, or flawed reasoning may enter into the decision making process. We will explore errors of reasoning that are so well

recognized that they have been given names. We will also look at some of the reasons that we are prone to such errors, so we can try to avoid making them.

We will also discuss selected issues related to professional integrity and ethics.

1.3 Timetable

This course will be taught asynchronously: there are no specific hours during which students must engage with learning materials.

Students must be available for in-person examinations (see information about assessments).

1.4 Final Exam

Exam details will be provided on Courselink.

2 Instructional Support

2.1 Instructional Support Team

Course Co-ordinator: Brad Hanna BSc, DVM, MSc, PhD

Email: bhanna@uoguelph.ca

Office: OVC 1646D

Please use Courselink Discussion Boards (where available) to post questions about course content. Questions that cannot be answered via discussion boards should be sent to my e-mail address.

3 Learning Resources

3.1 Required Resources

Unit 1 - Thinking, Fast and Slow. D Kahneman, Anchor Canada, 2013. (Textbook)
Paperback

Unit 2 - The CONSORT Statement 2010 Checklist (Website)

<http://www.consort-statement.org/checklists/view/32--consort-2010/66-title>

Freely accessible

Unit 2 - The CONSORT Statement 2010 Elaboration Document: (Website)

<http://www.consort-statement.org/downloads/consort-statement>

Freely accessible

4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. *Logic & Reasoning Unit* At the end of this unit, you will be able to:

1. Critically evaluate arguments according to five key criteria
2. Recognize common errors of logic and tactics for avoiding a good argument
3. Evaluate the potential role of subconscious mental short-cuts in flawed reasoning

2. *Critical Appraisal Unit* At the end of this unit, you will be able to:

1. Assess the quality of reporting of clinical trials at an intermediate level, based on CONSORT recommendations
2. Justify selected scientific procedures for the avoidance of bias
3. Understand the differences and interrelationships between a clinical trial, a systematic review, and a body of evidence
4. Recognize common ways in which medical research data can be misrepresented in scientific publications

3. *Scientific Integrity & Professionalism Unit* At the end of this unit, you will be able to:

1. Develop informed opinions about ethical issues related to health sciences research, such as plagiarism, fabrication of data, selective citation of the literature, authorship, peer review, and conflicts of interest
2. Be able to analyze the ethics of medical claims and beliefs using the criteria of WK Clifford

5 Teaching and Learning Activities

Learning activities will be on-line for the F2021 semester. (Assessments will include some in-person tests or examinations that must be attended by students.)

Learning materials will consist of a variety of asynchronous readings, video clips, voice-over

slide sets, and web-based resources. These materials will be posted week by week.

Some activities will be completed in assigned groups.

6 Assessments

6.1 Assessment Details

Course assignments (40%)

Assignments, both group and individual: 40% of the final grade

(Subject to change as required due to pandemic restrictions)

Midterm examination (20%)

An in-person evening or weekend examination to be scheduled by the Registrar.

(Subject to change as required due to pandemic restrictions)

Final Exam (40%)

Date: TBA

An in-person, comprehensive, short-answer examination to be scheduled by the Registrar.

(Subject to change as required due to pandemic restrictions)

7 Course Statements

7.1 Netiquette

Inappropriate online behaviour will be referred to the office of the Associate Dean (Students and Academic) for investigation. The range of possible penalties is listed in the Undergraduate Calendar, Section VIII: Undergraduate Degree Regulations and Procedures, Academic Misconduct, Penalties, Part A: Range of Penalties That May be Assessed, which includes loss of marks, loss of university scholarships or bursaries, suspension or expulsion from the university, and other penalties, depending on the offence. Examples of inappropriate online behaviour include:

Posting inflammatory messages about your instructor or fellow students

Using obscene or offensive language online

Copying or presenting someone else's work as your own

Adapting information from the Internet without using proper citations or references

Buying or selling term papers or assignments

Posting or selling course materials to course notes websites

Having someone else complete your quiz or completing a quiz for/with another student
 Stating false claims about lost quiz answers or other assignment submissions
 Threatening or harassing a student or instructor online
 Discriminating against fellow students, instructors and/or TAs
 Using the course website to promote profit-driven products or services
 Attempting to compromise the security or functionality of the learning management system
 Sharing your user name and password
 Recording lectures without the permission of the instructor

7.2 Department of Biomedical Sciences Guideline for Students with 3 Final Exams in a 48-hour Period

Eligibility

Student eligibility for this process is at the discretion of the Chair. For students with three or more exams in a 48-hour period in the first week of the final exam schedule, including an exam in a course offered by the Department of Biomedical Sciences, the department may offer a second writing of the exam in the second week of the final exam period. This policy does not apply to exams requiring complicated set-up, such as lab exams.

Process

The second sitting (a single date and time for all students seeking this accommodation) will be scheduled by the Chair's Office and invigilated by the course instructor, if available, or by the course TA or another invigilator. Following completion of the exam, the instructor/TA will mark the papers and submit the grades to the Registrar within 7 days of the last scheduled day of the final exam period.

Eligible students can request this privilege by sending an e-mail message by the 40th class day to the Department Chair (Dr Tarek Saleh). **In their request, the student MUST list their complete final exam schedule and a verbatim copy of the following statement:** "This is an accurate representation of my final exam schedule for the current semester as issued by the Registrar's office. I understand that if I have misrepresented my exam schedule and am granted permission to write the BIOM*4090 exam at the later date on that basis, I will have violated the University's academic misconduct policy which may result in a grade of zero for the BIOM*4090 final exam. I understand that steps will be taken to verify my course enrollment and final exam schedule."

Although the Department will make every effort to accommodate these requests, circumstances may not allow accommodation in all situations, and we cannot guarantee that requests will be approved. All email requests will receive a written response from the Chair regarding the decision.

8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be

noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

8.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
