



# BIOM\*4300 Biomedical Communications

Fall 2020

Section(s): 01 02

Department of Biomedical Sciences Credit

Weight: 0.50

Version 5.00 - Sept 10, 2020

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## 1 Course Details

“What is it that we human beings ultimately depend on? We depend on our words. We are suspended in language. Our task is to communicate experience and ideas to others.”

— Niels Bohr (1885 –1962).

“As ideas are preserved and communicated by means of words, it necessarily follows that we cannot improve the language of any science without at the same time improving the science itself; neither can we, on the other hand, improve a science without improving the language or nomenclature which belongs to it.”

— Antoine-Laurent Lavoisier (1743 –1794).

“If you can't explain it simply, you don't understand it well enough”

— Albert Einstein (1879 –1955).

### 1.1 Calendar Description

The purpose of this course is to develop students' ability to communicate scientific information logically and concisely, in written and oral formats. Students will be taught the basic principles underlying logical development of scientific arguments and hypotheses. Using practical examples drawn from current scientific literature, students will be exposed to the methods currently used by scientists in researching their subjects and writing about them in an effective fashion. Through written and oral presentation assignments, students will develop the skills necessary to confidently develop scientific presentations and communicate their knowledge and ideas to others.

**Pre-Requisite(s):** 14.00 credits including BIOL\*1080, STAT\*2040

### 1.2 Timetable

Mon-Wed-Fri 10:30-11:20am Section 1  
3:30 - 4:20 pm Section 2

## 1.3 Final Exam

There is no final exam in this course. Course assessment will be via a number of assignments set at intervals throughout the semester.

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# 2 Instructional Support

## 2.1 Instructor(s)

Neil MacLusky

Email: nmaclusk@uoguelph.ca  
Telephone: +1-519-824-4120 x54073  
Office: OVC 1688

## 2.2 Graduate Teaching Assistants

### Section 1:

Kate Nicholson Email: [knicho04@uoguelph.ca](mailto:knicho04@uoguelph.ca)  
Sydney Dobronyi Email: [sdobrony@uoguelph.ca](mailto:sdobrony@uoguelph.ca)

### Section 2:

Lauren Isaacs Email: [lisaacs@uoguelph.ca](mailto:lisaacs@uoguelph.ca)  
Anna Canella Email: [acanella@uoguelph.ca](mailto:acanella@uoguelph.ca)

Please contact teaching assistants only for purposes listed on Courselink. Content-related questions should be posted on Courselink Discussion Boards (where available); all other enquiries should be directed to the relevant instructor or course coordinator.

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# 3 Learning Resources

## 3.1 Recommended Resource(s)

University of Guelph Writing Assistance Resources (Website) <http://www.lib.uoguelph.ca/get-assistance/writing/book-appointments>

Understanding Plagiarism and Academic Integrity (Website) <http://www.academicintegrity.uoguelph.ca/>

What is Plagiarism? (Website) <http://www.academicintegrity.uoguelph.ca/plagiarism>

Annotated Bibliographies (Website) <http://www.lib.uoguelph.ca/get-assistance/writing/specific-types-papers/writing-annotated-bibliography>

Booth V. *Communicating in science: writing a scientific paper and speaking at scientific meetings*. Cambridge England; New York: Cambridge University Press, 1993. (Other)

Day RA. *Scientific English: a guide for scientists and other professionals*. Phoenix, AZ: Oryx Press, 1992. (Other)

Day RA, netLibrary I. *How to write & publish a scientific paper*. Phoenix, Az: Oryx Press, 1998.

(Other)

Gilpin AA, Patchet-Golubev P. *A guide to writing in the sciences*. Toronto: University of Toronto Press, 2000. (Other)

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## 4 Learning Outcomes

### Rationale for the course:

Communications skills are reported by employers to be the qualities they most desire in potential job applicants. The ability to communicate information and ideas to others is fundamental to every branch of science. In medicine, the communication skills of physicians have repeatedly been demonstrated to correlate with patient satisfaction and clinical outcomes, while training of medical students in a communications-oriented curriculum has been shown to significantly improve their success in clinical board examinations<sup>1</sup>. Clinical residents in training are required to regularly present clinical case studies to the rest of the department, as well as to actively participate in the teaching of undergraduate medical students. As a result, professional schools are increasingly using measures of communication ability as an integral component of their evaluation processes for potential students. Yet, little or no attention is paid in most B.Sc. programs to development of this particular skill set.

Communication skills do not come naturally, nor can they be learned by simply reading about the subject. They require development, with the opportunity for practice and feedback, before students can feel truly comfortable expressing themselves orally and in writing, in logical, clear and concise terms. The aim of this course is to provide students entering the third or fourth year of their B.Sc. degrees with instruction on the development of effective scientific communication skills. The skills learned in this course will be of value in the other fourth year courses given in the Bio-medical Science B.Sc., the majority of which now utilize independent learning projects, written assignments and class presentations, as methods of assessment. They will also help students in preparing for their post-graduate careers.

1. Yedidia MJ, Gillespie CC, Kachur E, Schwartz MD, Ockene J, Chepaitis AE, Snyder CW, Lazare A and Lipkin M Jr. Effect of communications training on medical student performance. *Journal of the American Medical Association*. 2003 Sep 3;290(9):1157-65.

The general aims of this course are:

- to assist students in developing clear, concise and logical approaches to writing about and presenting the biomedical literature.
- to enhance students' writing abilities, both in the translation of complex scientific language to lay terms that can be understood by the general public and in discussing research results in a clear and concise fashion.
- to develop students' ability to collect scientific information and synthesize it into coherent short oral presentations

The course is divided into units, an introductory unit that will fill approximately the first three weeks of the course, followed by other units which will run for varying periods of time throughout the remainder of the semester. Because exercises in various forms of communication could easily become fragmented and unsatisfying if they drew at random from different scientific fields, the majority of the course, after the initial introductory section, is framed around a single subject that is not systematically covered in any other course in the Biomedical Sciences Curriculum: Personalized Medicine. The majority of the individual assignments, student presentations, discussions and the final student assignment will all be based on material drawn from this subject.

## 4.1 Course Learning Outcomes

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

1. Objective 1: Methods of Biomedical Communications The first three weeks of the course will review the historical development of methods of scientific communication, provide students with instruction in the use of on-line scientific literature research tools, the peer review process used in evaluating submissions for publication and finally outline the basic principles of effective scientific presentations. The critical features of a good scientific argument, as well as common errors of logic in developing arguments and hypothesis, will be presented and discussed.
2. Objective 2: Writing in the Sciences The presentation and writing components will start during weeks 2- 3. Four different writing exercises will be assigned during the course: three short and one long. The course will involve three short written exercises:
  - (1) Students will be asked to prepare a brief personal statement, of the kind that might be required for application to a professional school (e.g. human or veterinary medicine, dentistry, graduate research – whatever is most appropriate for each student). Being able to present oneself well in a professional or job application, is probably one of the hardest things that you will ever have to do. It is not natural, for most people, to talk openly about themselves to strangers – yet still manage to create a good impression, without appearing either arrogant or (worse) dishonest. Most people have a hard time with it, yet we do almost nothing in the education system to train students in how to approach this activity.
  - (2) Scientific papers will be selected by the instructor, which students will be required to read and summarize in the form of a lay report (1,000 words or less) of the type that one might expect to see in the science editorial section of a newspaper or magazine.
  - (3) A series of reprints will be posted to the Courselink site. Students will each have to choose one of these reprints and summarize it, in no more than two single-spaced pages, as a handout that might be used, for example, in a journal club presentation. Example journal club presentations will be posted to Courselink to give you an idea of what is expected for this kind of summary.

The long assignment will mimic another activity that scientists and academic clinicians have to do all the time in their professional lives, namely review manuscripts for publication. As we will discuss in class, Peer Review is an essential part of the quality control mechanisms in science and medicine, to prevent people from publishing things for which there simply is not sufficient evidence. Unfortunately, papers are often submitted with errors and statements that represent exaggerations of the findings in them, the only way to control this is peer review. Even so, a considerable amount of error and misinformation still makes it out to the public. One only has to look at the damage that

has been caused all over the world by disinformation circulated this year, during the COVID-19 crisis, to realize how dangerous incorrect information can be.

The instructor will post 10 papers from the current scientific literature on personalized medicine. Students can choose any ONE of the papers for review. A template will be posted (the same template that is currently used by the Frontiers group of journals which include Frontiers in Endocrinology, Frontiers in Neuroscience, etc.) for students to use in structuring their reviews. The task for each student individually will be to take their chosen paper and critique it, using the rubric provided in the template. Even though the papers will be published papers, they may well contain errors and statements that are not adequately supported by the evidence, or perhaps information that is contrary to what others have already published in the same field. Unfortunately, reviewers are human too and they also make mistakes, resulting in sub-par papers being published. In the section of the review template entitled “Comments for communication to the authors” you should identify anything you feel could be improved in the paper. This is something that takes a bit of skill, because often one has to convey information to the authors that they don’t want to hear: it is very important that this is done constructively and diplomatically. For manuscripts submitted to them by scientists, the Frontiers journals publish the reviewers’ critiques alongside the papers, which means that poor quality or insulting reviews end up being published on the Internet for the entire world to see. This can really make the reviewer look bad. Constructive and helpful criticism is a useful skill, which also has to be learned – it doesn’t come naturally, to most people.

Comments and feedback on all the written assignments will be provided by the instructors and TAs, as learning tools for students as they progress through the course. Students are also encouraged to avail themselves of the writing assistance resources available through the University of Guelph Library (the web link is provided, below). Notably, the Library provides a number of useful handbooks on writing in the sciences, as well as the opportunity to arrange meetings with professional writing consultants (up to 3 meetings per semester, per student). Use these resources will help to avoid the most common structural and grammatical errors during the preparation of the written assignments.

3. Objective 3: Developing Effective Oral Communication Skills Presentations will take up the majority of the in-class time after the lecture sessions in the course. Two basic presentation formats will be included, with feedback being provided by the instructor and TA, as well as other students. All of the topics in the course will be drawn from currently active areas of research in the Health Sciences, so in addition to providing the students with practice at developing oral presentations and improving their speaking ability, the information presented in the classes will be informative and of interest to the entire class. Presenting scientific material to others now comes in two basic forms – presentations at scientific meetings (either as oral presentations or, more commonly, as posters) or presentations of ideas and proposals – as for example, in professional schools (medical and dental) in which resident trainees are required to present cases at clinical “Rounds” for discussion by the faculty, other trainees and medical students. We will explore both types of presentation in this class.
- Groups of 3-4 students will prepare posters on some aspect of personalized medicine, based on either the lectures or the posted published papers will be prepared based on a Powerpoint template posted by the instructor to the Courselink site. The posters will be presented in class time via Zoom, online, using the “share screen” option that Zoom has, allowing other students to log in and follow the presentations in real time, ask questions etc. All students in the class will, in addition, be required to submit written comments critiquing a total of 10

poster presentations by other students during the course (1 paragraph, up to 250 words, per presentation). Students comments will be circulated back (anonymously) to the presenters of the posters, for information purposes.

- In the same groups assembled for the poster presentations, students will develop a 10 minute Powerpoint slide presentation on a clinical case scenario. The instructor will post number of possible clinical case scenarios to the Courselink site, from which students can choose which one they want to present. Having chosen, you should communicate your choice to the appropriate TA so that we don't have multiple groups all trying to present the same case – each case should only be presented once. We have four TAs in this course, the class will be divided up alphabetically by surname and assigned so that each TA will be responsible for approximately half the students in each course section (i.e. approximately 40 students per TA). All students in the class will, in addition, be required to submit written comments critiquing a total of 10 “Rounds” presentations by other students during the course (1 paragraph, ~250 words per presentation). As with the poster presentations, class comments will be communicated anonymously back to the presenters.

The brief ~250 word poster and Dragon's Den critiques should be submitted within 48h of the relevant presentation, so that comments can get back to the presenters in a timely fashion. Submission deadlines for all the other components in the course will be listed on Courselink under course content. Drop boxes will be available for electronic submission of ALL assignments – everything will be done online, with no need to hand in paper copies of anything, or submit anything by e-mail.

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## 5 Teaching and Learning Activities

This is a lecture- AND discussion-based course, with some independent and some group learning components. Students are expected to participate in discussions and to conduct themselves in a scholarly and respectful manner at all times.

A schedule of lecture topics will be provided on the course website. We recommend that you engage with each activity on the day it appears in the schedule.

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## 6 Assessments

In all of the group assignments, students in each group will receive the same grade. In addition, students in each group will be asked to provide a mark out of 5 (the “group self- assessment” score) to rate the other student(s) effort and contribution to each of the group presentations.

### 6.1 Assessment Details

Written assignment 1 (10%)

Written assignment 2 (10%)

Written assignment 3 (10%)

Written assignment 4 (20%)

Poster presentation (10%)

Clinical “Rounds” presentation (15%)

Individual written critiques of 10 oral group presentations and 10 poster presentations (20% total)

Group “self-assessment” score (5%)

## 7 Course Statements

### 7.1 What is Personalized Medicine?

Personalized medicine is an extension of traditional approaches to understanding and treating disease. Since the earliest days of modern medicine, physicians have used evidence-based approaches based on observation and objective research findings to determine the best way to treat their patients. There was a minimal degree of “personalization” in that treatments were diagnosis based – a diagnosis of breast cancer, for example, might result in one of a number of different established radiation or chemotherapy-based protocols. However, individual differences between patients in terms of their clinical presentation, or the specific properties of tumors in each individual patient, were not used in refining therapy to optimize outcomes.

In modern personalized medicine, the tools provided to the physician are more precise, probing not just the obvious (such as an X-ray picture or histology slide), but the molecular characteristics of each individual patient’s metabolism as well as the specific properties of their disease. Looking at the patient at this level helps the physician understand the patient’s metabolism at a previously unparalleled level of detail, allowing treatment to be optimized on a patient by patient basis.

### 7.2 Communicating with faculty and TAs during the pandemic

Due to the COVID emergency, we will not have opportunities before or after class for answering questions this fall. If all questions are handled by e-mail, the volume of messages could become overwhelming at times (the course coordinator is teaching in three courses this semester, with total of over 400 students). To minimize the chances of that occurring, we ask that you check Courselink Discussion Boards when you have a content-related question, to see if it has been answered, and post your question there if it has not. If no discussion board has been established for the topic you wish to discuss, please contact the relevant instructor, or - *if directed to do so for a specific assignment or topic* - a teaching assistant. We will usually be able to reply to e-mail quickly, but there will be times during the semester when you may not receive a reply for 1-2 business days, depending on the volume of mail we are receiving and other work-related responsibilities.

### 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

## Course Evaluation

Students may be asked to complete a questionnaire on the instructors' on-line teaching abilities, either following the instructor's final learning activity or during the last two weeks of classes. If any evaluations of faculty teaching performance are held this semester, they will be administered by a third party and the results will be delivered to the instructors only after the final grades have been submitted to the Registrar's Office. The department Chair will see all numerical ratings, but only those comments that are accompanied by a student name (electronic selection in on line evaluations). These evaluations are used for tenure and promotion purposes.

## 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-regregchg.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 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/c08amisconduct.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 revision of the format of course offerings and academic schedules, based on circumstances. Any such changes will be announced via CourseLink and/or class email. 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**

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.

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