

BIOM*4300 Biomedical Communications Fall Semester 2017

“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).

Class location and meeting times:

Mon, Wed & Fri: 10:30AM - 11:20a.m. MCKN, Room 029

Office Hours OVC 1668 Tuesday 2-5pm

Instructor:

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I. 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 examinations¹. 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.

Unfortunately, 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.

II. Course Aims and Objectives:

The general aims of this course are:

- (1) to assist students in developing clear, concise and logical approaches to biomedical communications.
- (2) 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.
- (3) 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 examined in any other course in the Biomedical Sciences Curriculum: Personalized Medicine. The majority of the individual assignments, student presentations, discussions and the final student debate will all be based on material drawn from this subject.

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 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 the tumors in each 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.

Specific Learning Objectives:

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.

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 short exercises will consist of:

(A) 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).

(B) 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.

(C) A series of reprints will be posted to the D2L site for the course. 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.

The long assignment will consist of an unpublished draft manuscript that is complete in terms of the Abstract, Introduction, Methods, Results, Figures and References; but with the Discussion removed by the instructor. The task for students will be to take the material available to them and write a discussion that fairly reflects both the literature provided and the results presented, WITHOUT exceeding the total word limit for the paper defined by the journal instructions. To simulate the process that scientists have to go through in submitting and publishing their work, student submissions will be distributed, anonymously, by the instructor to other students in the class for them to comment on and provide feedback – which is what happens with peer reviewed scientific journal submissions. The feedback will be passed back to the original authors, again anonymously, and the authors can if they wish then use that feedback to improve their papers prior to final submission. ONLY the final submitted paper will be graded, and ONLY the instructors will know the identities of both the authors and the reviewers. High quality reviews will earn the reviewers up to 5% of the total course mark, in addition to the grades that they get for their own papers.

Comments and feedback on all the written assignments will also be provided by the instructors, 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.

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 – for example, presenting an idea to a company or a group of potential investors, asking for financial support to develop a concept. We will explore both in class.

(A) Groups of 3-4 students will prepare posters on some aspect of personalized medicine, potentially based on either the lectures or the posted papers. Posters will be prepared based on a Powerpoint template posted by the instructor to the Courselink site. Students will not have to arrange to print the posters themselves – they will be able to submit them all on line and they will be printed commercially in time to be picked up the day before the poster presentations. All students in the class will, in addition, be required to submit written comments critiquing a total of 5 poster presentations by other students during the course (1 paragraph, up to 250 words, per presentation).

(B) In the same groups assembled for the poster presentations, students will develop a 15-18 minute Powerpoint research presentation on a topic chosen by the group, the only limitation being that the subject must be relevant to material being presented in the course (i.e. personalized medicine). These presentations should include a brief review of the literature in the field, to provide the rationale for a research proposal which will be defended in front of the class in a format similar to the popular “Dragon’s Den” TV program. The research proposal should include a brief summary of the methodology and experimental approaches that you might use. Seven to ten minutes will be available at the end of each presentation for questions from other students, so that 2 presentations can be included in each 50 minute lecture slot. Each group should prepare and submit a two page summary of their presentation (point form, like the one prepared for writing assignment 2C) and submit in pdf format BOTH the summary and the presentation itself the day before the presentation is scheduled, so they can be posted to Courselink for the benefit of the rest of the class. All students in the class will, in addition, be required to submit written comments critiquing a total of 5 “Dragon’s Den” presentations by other students during the course (1 paragraph, ~250 words, per presentation).

The brief poster and Dragon’s Den critiques should be submitted by the end of the week following the presentations – Nov 3 for the poster critiques, Dec 6 for the Dragon’s Den (Drop boxes will be available for electronic submission of ALL assignments – you don’t need to print out and submit hard copies).

III. Format and Procedures:

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.

IV. Recommended Texts and Resources for the course

Web based resources

- University of Guelph Writing Assistance Resources:
<http://www.lib.uoguelph.ca/get-assistance/writing/book-appointments>
- Understanding Plagiarism and Academic Integrity:
<http://www.academicintegrity.uoguelph.ca/>
- What is Plagiarism?
<http://www.academicintegrity.uoguelph.ca/plagiarism>
- Annotated Bibliographies:
<http://www.lib.uoguelph.ca/get-assistance/writing/specific-types-papers/writing-annotated-bibliography>

Publications:

- Booth V. Communicating in science: writing a scientific paper and speaking at scientific meetings. Cambridge England; New York: Cambridge University Press, 1993.
- Day RA. Scientific English: a guide for scientists and other professionals. Phoenix, AZ: Oryx Press, 1992.
- Day RA, netLibrary I. How to write & publish a scientific paper. Phoenix, Az: Oryx Press, 1998.
- Gilpin AA, Patchet-Golubev P. A guide to writing in the sciences. Toronto: University of Toronto Press, 2000.

V. Calculation of Course Grades

Written assignment 1	5%
Written assignment 2	5%
Written assignment 3	10%
Written assignment 4	20%
Poster presentation	10%
“Dragon’s Den” presentation	10%
Group self-assessment	5%
Individual written critiques of 5 oral group presentations 5 poster presentations	10%
Editorial feedback on other Student submissions for The 4 th written assignment	5%
Final written exam	20%

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 the group presentations.

VI. Academic Integrity

The University of Guelph takes a very serious view of Academic Misconduct. Included in this category are such activities as cheating on examinations, plagiarism, misrepresentation, and submitting the same material in two different courses without written permission. Students are expected to be familiar with the section on Academic Misconduct in the Calendar and should be aware of the possible penalties for contravening the University's rules on this subject. Please note the section on Courselink about the computer program "Turnitin". This program is available to students as a tool to check writing assignments for originality and it is really useful, in verifying that students have not inadvertently copied material they may have recalled from something they have read.

VII. Accommodations for students with disabilities

Students should register with the Centre for Students with Disabilities to verify their eligibility for appropriate accommodations, and then contact the course coordinator to discuss specific needs.

VIII. Course Evaluation

Students will be asked to complete a questionnaire on the instructors teaching abilities. This information is required by the university to evaluate faculty performance for purposes of Tenure, Promotion and Annual Pay Increases. Administered by a third party rather than the instructor, these evaluations will be delivered to the instructors only after the final grades have been submitted to the Registrar's Office. The numerical ratings from the form will be made available to the Chair for administrative purposes. If a student wishes the Chair to see his/her written comments in addition to the scores, he/she must include with those comments his/her name (written legibly) and signature.

Fall 2017 Lecture Schedule

#	Date	Subject
1	Sep 8	Introduction to Course
Biomedical Communication: what's important?		
2	Sep 11	Lectures and class exercises
3	Sep 13	Lectures and class exercises
4	Sep 15	Lectures and class exercises
5	Sep 18	Lectures and class exercises
6	Sep 20	Lectures and class exercises
7	Sep 22	Peer Review: why, how, is it important?
Gender Bias in Medicine		
8	Sep 25	Gender Bias in Medicine – Lecture 1
9	Sept 27	Gender Bias in Medicine – Lecture 2
10	Sept 29	Gender Bias Lecture 3: Drug Metabolism
Personalized Medicine in Endocrinology		
12	Oct 4	Endocrinology Lecture 1
13	Oct 6	Endocrinology Lecture 2
	Oct 9	No class – Thanksgiving/Reading break
Poster Sessions		
14	Oct 11	Poster Sessions 1
15	Oct 13	Poster Sessions 2

16	Oct 18	Poster Sessions 3	
17	Oct 20	Poster Sessions 4	
18	Oct 23	Poster Sessions 5	
19	Oct 25	Poster Sessions 6	
20	Oct 27	Poster Sessions 7	
Personalized Medicine in Hormone Dependent Cancer			
21	Oct 30	Cancer Lecture 1	
22	Nov 1	Cancer Lecture 2	
23	Nov 3	Cancer Lecture 3	
24	Nov 6	Cancer Lecture 4	
Dragon's Den			
25	Nov 8	Dragon's Den: Student Seminars	
26	Nov 10	Dragon's Den: Student Seminars	
27	Nov 13	Dragon's Den: Student Seminars	
28	Nov 15	Dragon's Den: Student Seminars	
29	Nov 17	Dragon's Den: Student Seminars	
30	Nov 20	Dragon's Den: Student Seminars	
31	Nov 22	Dragon's Den: Student Seminars	
32	Nov 24	Dragon's Den: Student Seminars	
33	Nov 27	Dragon's Den: Student Seminars	
34	Nov 29	Dragon's Den: Student Seminars	
Final exam: 2:30-4:30 p.m. Friday Dec 15, 2017			