

Moravian College  
Department of Biology  
Senior Seminar (BIO 370)  
The Science & Ethics of Modern Biomedical Technologies  
Fall 2007

<u>Instructor</u>	<u>Phone</u>	<u>E-mail</u>	<u>Office</u>
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**Office Hours:** Monday 9:00 - 10:00 am  
Wednesday 9:00 - 10:00 am & 1:00 - 2:00 pm  
Thursday 1:00 - 2:00 pm

**Class Meeting Times:** Tu, Th 2:20 - 3:30 pm 301 PPHAC

**Course Prerequisites:** Senior status or permission of instructor

**Required Textbook:** Pechenik, J.A. 2004. A Short Guide to Writing About Biology. 5<sup>th</sup> Edition. Pearson/Longman NY, 302p.

**Additional Required Reading:** *You will also have several readings from journals, media, and internet sources throughout the semester.*

**Course Introduction and Description:**

This course fulfills the writing-intensive requirement for the Biology major and serves as the capstone experience for all Biology senior students. The theme for this particular seminar course grew out of three independent study projects that I was involved with over the past two years, a strong interest amongst Moravian College students in biomedical topics, and a recognized need by the department to focus more on scientific ethics in our curriculum.

We are all concerned about maintaining our own personal good health, and at least to some extent, we should also promote good public health, even if for self-serving reasons. We also expect to have a high quality of life for as long as possible. Scientific advances in various fields have provided valuable information about living organisms at many levels (molecular to organismal) in both healthy and diseased states and we have gained much insight into the molecular basis of many diseases. We know that a wide variety of factors contribute to our health: genetics, diet, environmental conditions, social interactions, state of mind and other personal behaviors.

Scientific research and technological developments have led to new diagnostic tools which allow abnormalities to be detected in the early stages of a disease; this in turn, often enables a wider range of treatment options and preventative strategies. A doctor's tool kit now includes everything from tongue depressors to lasers. A physician no longer has to rely solely on listening to a patient to describe symptoms (although that is valuable), but now also has the option of conducting a genetic screen of an individual's DNA to diagnose and confirm a medical condition (although this has an extremely high price tag).

Medical advances over the past 100 years have significantly lengthened the average life expectancy (at least in developed nations), and have dramatically improved the quality of life for countless people around the globe. However, technologies that began to emerge towards the end of the 20<sup>th</sup> century and continue to be developed today seem to almost border on science fiction, and while they are exciting and have great potential, they also have tremendous risk associated with them and raise new ethical dilemmas. Certain technologies such as gene therapy, *in utero* screening, nanotechnologies, etc. begin to blur the distinction between what is natural vs. man-made, and between what is human vs. machine. Is there a line that we should not cross when it comes to human health care? Much of medical information comes from non-human *biological models* – itself a topic of controversy both scientifically and ethically. Should the condition of humans be improved at the expense of other living things? Should we use human-derived cells and tissues for experimentation? Ongoing research and the development of new technologies are expensive. When the cost of medical care has escalated to the point where a large percentage of the people in the world don't have access to a high quality of care, much less all the new diagnostic tests and cutting-edge therapies, at what point do we say “enough” and focus, instead, on providing a basic level of care for everyone?

Throughout the semester, it is my plan that we will explore these types of complicated and controversial issues in greater detail and that you leave with a better understanding of the life science research behind new biomedical technologies as well as the social, ethical and political implications of such advances.

**Course Objectives:** Upon completion of this course the students will be able to:

- 1) thoroughly research a specific topic related to science of a modern medical technology (development of new technologies, applications to specific diseases, etc.) using primary and secondary literature sources;
- 2) concisely express a research topic in abstract form;
- 3) construct successful outlines and drafts of written work from peer and professor feedback;
- 4) complete a research paper with appropriate scientific citations;
- 5) effectively discuss primary literature through journal club sessions;
- 6) present their comprehensive research before peers and instructor using Power Point software as well as address questions regarding their work; and
- 7) objectively critique peer abstract writing samples and ask questions during discussions and after student presentations.

Finally, last year, the Department of Biological Sciences determined that we need to have a better understanding of what our majors are learning (or not) throughout their time at Moravian College. A valid assessment of student learning in biology will guide us to refine our curricular offerings and hopefully improve our programs. To this end, we agreed to pilot the ETS standardized test in biology in our senior seminar courses. This test will not count toward your grade in this course, but it is expected that you all participate and take the test seriously so that the information we glean from this is valid and useful. We will use the exam period assigned to this course to administer this test in December.

**Grading:** The grading system is as follows: (+/- will be administered as professor deems appropriate)

A = 90 - 100 %

B = 80 - 89 %

C = 70 - 79 %

D = 60 - 69 %

**Course Requirements:** The student's grade will be based on the following:

Writing exercises (misc. assignments throughout semester, including questions for seminar speakers)	250 points
Draft of research paper due 2 weeks prior to presentation	50 points
One written research paper	200 points
One abstract	100 points
Abstract and primary article submitted <u>on time</u> to the instructor for classmates to access ( <i>All or nothing grade</i> )	50 points
One research presentation and follow up question-answer session	200 points
Resume exercise	100 points
Class participation & attendance	<u>150 points</u>
	1100 points

\*\* The "class participation grade" is based on your participation and preparation for each class session.

Therefore, excessive absences could have a negative effect on your final grade for the course.

\*\* Please note : it is within the instructor's purview to apply qualitative judgment in determining grades for assignments or the entire course

**Expectations:**

- a) Attendance: Regular class attendance is expected. **No** make-up presentations will be permitted unless you have an acceptable reason (family emergency, illness, etc) - with documentation. If an emergency should arise, you must notify the instructor prior to the presentation date and **not** after. Notification from the Moravian College Health Center, Learning Services or the Moravian College Dean of Students' Office will be necessary if you miss more than two seminar classes. I will recognize legitimate excused absences such as when students are representing the university in an official capacity (e.g. for presentation at scientific meetings, intercollegiate athletic competition, but not practice, off-campus music performances, etc.). Such activities are scheduled ahead of time; thus, we expect you to make arrangements with us ahead of time as well. Please note: Students who arrive late to class disrupt the flow of the session and distract their peers. Please be prompt!
  
- b) Cheating or plagiarism will not be tolerated. Plagiarism may result in failure of the course. Students will be held to the highest standards as specified by the Moravian College Honor Code. Violations of this code will be handled in the most severe manner allowed by college policy. Please read the Academic Honesty Policy that is included in the student handbook *and* the policy that will be distributed in class. We have attached a cover sheet to our policy that each of you will sign indicating that you have read and understand the policy and implications of violating it. If you have any questions about plagiarism or other forms of academic dishonesty, please ask. Several assignments in this class will involve the use of

internet resources, and it is my experience that students often do not realize that copyright violations and plagiarism policies still apply.

- c) Appropriate Literature Sources: All students will be required to understand the differences between primary and secondary literature sources. The college subscribes to many science-based databases that you should be familiar with as they will be invaluable sources of information for your paper and seminar; “Web of Science”, “Science Direct”, “Basic Biosis” are some examples. Public-domain internet sources can be helpful but you must critically evaluate the information obtained from such sources – especially if they are not primary sources. **Under no circumstances are you to use “Wikipedia” as a reference for any assignment.**

\*\*\*\* Throughout the semester, I would like for you to pay attention to media and popular press coverage of topics related to this course. We will routinely use part of our class period for “*Biomedical Science in the News*” discussions. Your informed contributions to these discussions will be viewed favorably when assigning final grades! \*\*\*\*

- d) Reading Assignments : should be completed prior to each class session
- e) Writing Assignments : A rough draft of your final research paper is due to the instructor **two weeks** prior to your presentation date. **Ten points will be deducted from your grade for every day it is late.** It will be evaluated and returned to you within one week. An abstract of your presentation as well as your primary article are to be placed on reserve in the library **one week** prior to your presentation date. You will need to drop off a copy of your abstract and primary article to the instructor’s office that same day **to receive full credit.** Your final research paper (8 - 10 pages) is due to the instructor **on the day you are scheduled to present your research topic. If it is not submitted on that day, 20 points will be deducted from the “research paper” grade for every day it is late.** You are each responsible for knowing the timeline for your assignments.
- f) Extra Help : If any difficulties arise during this course from selecting a research topic to designing your presentation, please see me. *I will be happy to help!* The reference librarians in Reeves Library are also willing to assist you with reference materials. Please contact the Moravian College Writing Center for further assistance in writing and revising your abstracts and research papers

*Best wishes for a great semester!*  
- D. Husic

## Class Schedule<sup>1</sup>

<u>Date</u>	<u>Topic</u>
Aug. 28	Introduction and Expectations/Review of Syllabus and Criteria for Paper and Oral Presentation Selection of Presentation Dates Discussion: Course themes and definitions
Aug. 30	On Death and Dying; Implications of Life-Extension Technologies ( <i>Is this medicine?</i> ) An Introduction to Ethics
Sept. 4	Discussion of WHO Life Science Report; A Consideration of New Technologies, Risks and Benefits, Costs, Accessibility and Ethical Dilemmas Role of the General Public and Politicians in Determining the Direction and Funding of Biomedical Research ( <i>Please say it isn't so!</i> )
Sept. 6	Writing a Research Paper vs. a Review Paper – Finding Examples of Each
Sept. 11	Journal Club Discussion
Sept. 13	Abstract Writing Exercise/Peer Review
Sept. 18	Searching the Literature & Preparing a Draft <b>Tentative Topic for Seminar/Paper Due</b>
Sept. 20	Preparing a Final Draft/Citations Creating Power Point and Posters
Sept. 25-27	Sample Power Point by Students/Critiques <b>9/25/07: Outline for Presentation Due by 5:00 pm</b>
Oct. 2	View video from PBS “Stealing Time” Series
Oct. 4	Discussion on Video/Biomedical Science in the News Day (or view 2 <sup>nd</sup> video in series)
Oct. 9	<b>Fall Recess!!!!</b>
Oct. 11	Resume Writing/Careers in Biomedicine
Oct. 16	Presentation #1 <sup>2</sup> 1 <sup>st</sup> Annual Sipple Lecture: Dr. Sara T. Fry “Moral Leadership in Global Health” 5:30 pm Prosser Hall - ATTENDANCE EXPECTED
Oct. 18	Presentation #2
Oct. 23	Presentation #3
Oct. 25	Presentation #4
Oct. 30	Presentation #5
Nov. 1	Presentation #6
Nov. 6	Presentation #7
Nov. 8	Presentation #8
Nov. 13	Presentation #9
Nov. 15	Presentation #10
Nov. 20	Presentation #11

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<sup>1</sup> Details on specific readings and assignments will be distributed in weekly course outlines.

<sup>2</sup> After each presentation, there is likely to be time remaining in class. We will use this time to discuss relevant news stories and journal articles related to course themes.

Nov. 21-25	<b>Thanksgiving Holiday</b>
Nov. 27	Presentation #12
Nov. 29	Presentation #13
Dec. 4	Resume critiquing Day (or a make-up day if needed)
Dec. 6	Journal Club/Course Debriefing
Dec. 12-15, 17 - 19	<b>Final Exam Period: ETS Standardized Test Pilot</b> (specific date and time TBD)

### Timeline and Important Suggestions for Writing Your Research Papers

#### Timeline:

- Topic due to Dr. Husic on September 18<sup>th</sup> at the beginning of class
- Outline for seminar and paper due to Dr. Husic on September 25<sup>th</sup> by 5:00 pm
- Rough draft of paper due two weeks prior to presentation date
- Abstract and primary article due to professor to be placed in student room in Collier (311) by 5:00pm one week prior to presentation date; class members to review and draft 1 to 2 questions for speaker – in writing. These will be collected after each seminar.
- Final paper due on day of presentation!

#### Expectations:

- Your research paper and presentation are to be a **review and analysis** of several research projects reported by various scientists on your topic in the field of aging – do not give a summary of only one research paper.
- You are expected to cite a minimum of **three *primary scientific papers*** and **two *secondary references***.
- You are to submit copies of all primary literature sources with the rough draft of your paper.
- Your primary article should not be from work published prior to 1996.
- Any figures or images should be attached at the end of the 8 - 10 page paper (as an appendix) – do not place in the body of your paper. The figures should be numbered and have titles and, if taken from some source, this should be noted. Technically, you should have permission to use figures from published sources (including the internet).
- Please visit the Writing Center if you are having difficulties in composing your final draft.

### Grading Criteria for Research Paper:

- Clarity of writing
- Quality of writing (grammar, punctuation, etc)
- Ability to summarize research information
- Appropriate detail
- Correct interpretation of data
- Correct use of key terms
- Appropriate References

### Timeline and Important Suggestions for Oral Presentations

#### Timeline:

- Topic due to Dr. Husic on September 18<sup>th</sup> at the beginning of class (the topic for your paper and presentation is the same although the specific content of each may vary.
- Outline for seminar and paper due to Dr. Husic on September 25<sup>th</sup> by 5:00 pm
- Abstract and primary article due to professor to placed in student room in Collier (311) by 5:00pm one week prior to presentation date; class members to review and draft 1 to 2 questions for speaker - in writing. These will be collected after each seminar.

#### Expectations:

- See attached seminar evaluation sheet to get a sense of what your peers and I will be evaluating you on.
- Oral presentations must be accompanying by a Power Point slide show which will be submitted to Dr. Husic on the day of your presentation.
- Oral presentations should be a minimum of 35 to 40 minute, but should not exceed 50 minutes. Plan on approximately 10 minutes of questioning from your audience.
- Topic due to Dr. Husic on September 18<sup>th</sup> at the beginning of class (the topic for your paper and presentation is the same although the specific content of each may vary.
- Remember the importance of appearance, poise, etc. during a professional presentation. Developing confidence and presenting yourself in a professional manner will go far in helping you during interviews, future presentations for your career, etc.