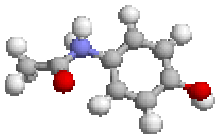
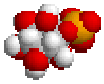
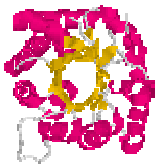
Syllabus for:





CHEM 199-001
First Year Seminar in Chemistry:
The Science of Pharmaceutical Development



Instructor

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Introduction

The goal of this course is *not* to prepare drug development scientists. This is not possible even in an entire undergraduate education, much less in a single course! Rather my goals in offering this course are four-fold:

- To show the interdisciplinary nature of modern science

  The pharmaceutical development process is not the domain of a single branch of science. Modern drug companies hire teams of scientists trained in many different specialties to work in their research and development laboratories. Thus, despite this course being labeled a "chemistry course" we will explore many different fields of science as we progress through the semester. In many class sessions we will range from topics in physics, chemistry, biology, mathematics and even philosophy/ethics. I will on some occasions point out this "interdisciplinary-ness", but on many occasions I will fail to remember to do so… it is worth keeping in the back of your mind that the labels we (especially us in academics) apply to our various disciplines are somewhat arbitrary and many times useless when it comes to solving "real world" problems such as drug development.

- To show that scientific progress is made via a cyclic process of hypothesis and experiment

  The goal of science is never to arrive at "the answer" (implying a static and ultimate end) but rather to arrive at the "best current understanding" of a phenomena; leaving open the possibility that future work and discoveries will cause our understanding to change. In order to achieve this goal scientists use cyclic process where the current understanding of a topic leads the scientist to propose a hypothesis (a testable prediction). The practicing scientist then performs experiments with the goal of verifying (or refuting) the hypothesis. The results of these experiments are used to refine our understanding of the topic and to guide revision of the hypothesis. As we will see during the semester, the pharmaceutical development process is a perfect place to illustrate both the cyclic and the open ended nature of this "scientific method".

- To show that all scientific/technological advances, and indeed many other things in life, involve a balance between risk (or cost) and benefit.

  Many (… most… all?) decisions in life involve some sort of cost/benefit calculation where one balances the "pluses and minuses" of an issue before deciding how to proceed. As we will see, the pharmaceutical development process is an ideal place to show how these are sometimes difficult decisions to make, even given "hard" data, and that there is often not a single "correct" answer to these "calculations".

- To provide knowledge and background in the specific subject matter to remove the "black box" nature which surrounds the laypersons view of pharmaceutical development

  To discuss the pharmaceutical development process without some understanding of the basic nature of molecules, especially biological molecules, and living systems is like having a complete understanding of how ice cream is made without ever having tasted ice cream! Thus, along with the process we will learn something about the "facts" of chemistry, biology, physics and mathematics as they apply to the drug development process.

Course Materials

Required text: None.

From time to time other materials may be required; some of these materials will be available on the course website, others may need to be photocopied at the library. The instructor will announce the need and availability of these materials as the semester progresses.

Evaluation of Student Performance (grading) and Academic Policies

Students will be assessed on the basis of three types of evaluations: writing assignments, quizzes and participation in discussions.

The first year seminars are, in part, designed to help you understand "our" expectations for college-level writing. Thus, we will work explicitly on the research-skills needed for college-level work. We will stress the need for students to begin writing assignments early and to get in the habit of writing (and revising) multiple drafts of a paper. These skills will be developed and assessed via three writing assignment (two five-page papers during the semester and one ten-page paper at the end of the semester). The due dates for each assignment will be announced at the beginning of the semester. *Late assignments will not be accepted.*

Reading is a large part of college-life, this class will involve regular reading assignments and discussion of the current reading in class. In order to "encourage" students to be prepared for class, many sessions will begin or end with a short (one or two question) "quiz"; these will *not* be announced ahead of time. *Make-up quizzes will not be given under any circumstances.*

Seminar classes are meant to be interactive, while I will lecture some (especially at the beginning of the semester), many classes will consist of a guided discussion, enlightened by the reading (see above) students have done.. These discussions will play a large role in the learning process. Thus, if you aren't in class you won't be learning and if you aren't here to learn you shouldn't be here! Therefore, *attendance at all class sessions is mandatory.* Missing more that one or two classes during the semester *will* lower your grade. Near mid-term, I will assign each student a provisional "participation grade" in order to provide feedback in this area.

Each of these assessments will each be assigned a letter grade and a final grade determined by applying a "gpa type" calculation with the following weights:

% of final grade	
20	Writing Assignment #1 (including drafts)
20	Writing Assignment #2 (including drafts)
20	Writing Assignment #3 (including drafts)
20	Quizzes
20	Class Participation

Plagiarism and other forms of cheating are not permitted in this class. Just so there is no ambiguity, I have reproduced the dictionary definition here:

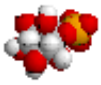
> *Plagiarize*
>
> 1) to steal and pass off (the ideas or words of another) as one's own **:** use (another's production) without crediting the source
>
> 2) to commit literary theft **:** present as new and original an idea or product derived from an existing source
>
> From the Merriam-Webster Online Dictionary
> (http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=plagiarize)

Ideas are the basic product of science, indeed of all of academic fields, and plagiarism is theft of ideas… simple as that. The key issue in avoiding plagiarism is the citation (crediting) of sources. We will talk more about this topic in class.

I take plagiarism and other forms of academic/scientific misconduct seriously. The first incident of plagiarism (or cheating, more generally,) in this class will result in the student earning a grade of "F" on the assignment and we (the student and instructor) will have a long talk about academic and personal honesty. A second incident of plagiarism (or cheating, more generally,) by the same student will result in their earning grade of "F" for the entire course. I also reserve the right to use the College's formal mechanisms for dealing with academic dishonesty as outlined in the College catalog (see: http://www.bridgew.edu/Catalog/ugpol.pdf) if I deem necessary.

Very Preliminary and Tentative Schedule / Course Outline

Week of	*Topic*
3 Sept	Introduction & History
10	Molecules – small and large (some chemistry & biochemistry)
17	"
24	"
1 Oct	Biomedical Sciences: Physiology, Pathology & Pharmacology
8	"
15	"
22	Pharmaceutical Research & Development
29	"
5 Nov	"
12	"
19	The Pharmaceutical Business
26	Case Studies
3 Dec	Hot Topics – The Future
10	Open



Due Dates, etc. for Writing Assignments

Writing Assignment #1 –
- Draft version due: 11:15 AM on Friday, 12 Oct.
- Conferences: 15-17 Oct. (required)
- Final version due: 11:15 AM on Friday, 19 Oct.

Writing Assignment #2 –
- Draft version due: 11:15 AM on Wednesday, 21 Nov.
- Conferences: 26-28 Nov. (required)
- Final version due: 11:15 AM on Friday, 30 Nov.

Writing Assignment #3 –
- Draft version due: 11:15 AM on Wednesday, 12 Dec.
- Conferences: 14, 17, 18 Dec (optional)
- Final version due: noon on Wednesday, 19 Dec.