

CHEM-342 INTRODUCTION TO BIOCHEMISTRY
FINAL COURSE EVALUATION
Friday May 14, 2004

Instructions: Please answer the following questions honestly and thoughtfully. Return the completed evaluation to 116 Brown Laboratory **no later than 4:00 PM Tuesday, May 18. Make sure** you check-off your name on the course roster there. For Question 45 of this evaluation, you will need to reread the course syllabus.

1. Consider the following items and rate them with respect to how important they are for success in CHEM-342.

Category	ex.imp	v.imp	res.imp	sl.imp	not.imp	N	Avg	S.D.	Q#2
a. Personal Initiative	18	6	3	0	0	27	1.444	0.685	14
b. Library Research Skills	13	14	1	0	0	28	1.571	0.562	19
c. Taking Notes in Class	2	10	12	4	0	28	2.643	0.811	2
d. Writing Skills	2	15	10	1	0	28	2.357	0.666	7
e. Collab. with Classmates	16	12	0	0	0	28	1.429	0.495	21
f. Oral Communication Skills	12	13	3	0	0	28	1.679	0.658	21
g. Prior Knowledge	3	12	12	1	0	28	2.393	0.724	4
h. Memorization	0	2	5	17	4	28	3.821	0.758	1
i. Learning New Info.	15	11	2	0	0	28	1.536	0.626	7
j. Problem-Solving Skills	15	12	1	0	0	28	1.500	0.567	13
k. Conceptualization	16	11	1	0	0	28	1.464	0.566	15
l. Attendance	19	7	2	0	0	28	1.393	0.618	14

2. Reconsider the items *a* through *l* in relation to other science courses you have had. Circle those items which, in your experience, are more important in CHEM-342 than in those other courses. (Circle as many as are appropriate.)
 [Results tabulated in last column in the above table.]

3. On average, I spent ___ hours a week on work related to CHEM-342.

7.73 ± 3.00 Hours with a range from 2 to 15 hours per week.

For statements 4 through 41, put a check in the box that best reflects how strongly you agree or disagree with each.

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree	N	Avg	S.D.
4 Good idea form new groups after midterm?	3	3	4	10	8	28	3.607	1.291
5 Demonstrations helped my understanding of articles	5	20	2	1	0	28	1.964	0.626
6 Peer Eval worthwhile activity	3	15	7	3	0	28	2.357	0.811
7 My group have done fine without tutor	0	2	1	17	8	28	4.107	0.772
8 Instead of Group work, Dr. White should lecture more	6	5	9	6	1	27	2.667	1.155
9 I think C342 exams should focus more on content	1	6	11	9	0	27	3.037	0.838
10 My assignments were graded & returned promptly	21	7	0	0	0	28	1.250	0.433
11 Considerable amt of C342 material was review for me	3	13	2	9	1	28	2.714	1.129
12 It was bad idea to change tutors after Spring Break	1	2	4	13	7	27	3.852	1.008
13 Concept map not group effort	2	7	4	13	2	28	3.214	1.113
14 Grades in C342 should be solely on indiv performance	1	4	8	13	1	27	3.333	0.903
15 Talked freq about class topics with others outside class	1	11	0	11	4	27	3.222	1.227
16 I feel I can apply general principles here to other courses	9	14	4	1	0	28	1.893	0.772
17 I found the hemoglobinopathy assign worthwhile	8	14	3	3	0	28	2.036	0.906
18 My ability to find, read, & analyze info improved	13	13	2	0	0	28	1.607	0.618
19 I feel confident I can read & understand research articles	8	19	1	0	0	28	1.750	0.509
20 I am comfortable working in groups	14	11	2	1	0	28	1.643	0.766
21 I am comfortable sharing information	15	11	2	0	0	28	1.536	0.626
22 I am comfortable asking help from others	13	13	2	0	0	28	1.607	0.618
23 I am comfortable relying on information from others	4	15	8	1	0	28	2.214	0.725
24 Given opportunity, like another course designed like this	3	10	11	3	1	28	2.607	0.939
25 Disc. of mystery molecules made connections other chem	6	12	4	5	1	28	2.393	1.113
26 I found the course web-site a useful resource	13	13	1	0	1	28	1.679	0.847
27 I found the quotations on board thought provoking	8	9	7	4	0	28	2.250	1.022
28 I enjoyed working in jigsaw groups	12	8	4	4	0	28	2.000	1.069
29 Wireless laptop computers are of little use in this course	2	4	10	9	3	28	3.250	1.056
30 My group made use of the classroom library	2	22	1	2	1	28	2.214	0.818
31 I found the visitors who observed the class distracting	0	3	6	12	7	28	3.821	0.928
32 Having Dr. Lois Dow talk with the class about her experiences as a hematologist was worth while.	10	13	4	0	1	28	1.893	0.900

Statement	1. Excellent	2	3	4	5 Very Poor	N	Ave	SD
33 Rate this class, overall	6	14	8	0	0	28	2.071	0.703
34 Rate this instructor, overall	12	12	3	1	0	28	1.750	0.785

Rate each of the articles you studied with respect to its overall contribution to your learning and the goals of the course.

	ex.imp	v.imp	res.imp	sl.imp	not.imp	N	Ave	S.D.
35 Stokes (1864)	12	10	4	2	0	28	1.857	0.915
36 Zinoffsky (1886)	7	15	5	1	0	28	2.000	0.756
37a Conant (1923)/Pauling & Coryell (1936)	1	11	12	4	0	28	2.679	0.758
37b Svedberg & Fahraeus (1926)/Adair (1925)	1	8	16	3	0	28	2.750	0.688
37c Diggs et al (1933)/ Herrick (1910)	1	12	12	3	0	28	2.607	0.724
37d Bohr et al (1904)/ Peters (1912)/ Douglas et al (1912)	3	11	11	2	0	27	2.444	0.786
38 Shemin and Rittenberg (1946)	0	13	6	7	1	27	2.852	0.931
39 Pauling et al (1949)	10	14	4	0	0	28	1.786	0.674
40 Ingram (1958/1959)	11	15	2	0	0	28	1.679	0.601
41 Allison (1954)	7	13	4	4	0	28	2.179	0.966

Narrative Responses. [Comments transcribed directly from the evaluation forms in the order received.]

42. In an informative sentence or two, describe or characterize CHEM-342 to someone who might consider taking the course, e.g. What is the essence of this course?

- A. Learning how to access, use & question scientific information encourages asking questions and curiosity. A worthwhile experience in working with groups, and in trying to get your thoughts or knowledge across to other people in a non-threatening environment.
- B. Attendance, group participation & early preparation is (sic) important to keep track with course materials.
- C. This course, like most other upper-level chemistry courses, is all about application, not memorization. You have to apply and remember what you have learned in the past and have a lot of self-motivation or you will not be successful in this class.
- D. CHEM-342 essentially involves learning completely on your own with the facilitation of group members. You learn how to research and formulate scientific questions.
- E. This is a problem-based learning course where 90% of the information you will have to find out on your own.
- F. CHEM-342 is about learning how to understand things you don't know about.
- G. The course is a survey of scientific journal articles relating to the biochemistry of hemoglobin. It involves a great deal of independent reading and research intended to provide an introduction to the field of biochemistry.
- H. Chem-342 will force you to understand and learn. Working in groups will help motivate you to research and participate.
- I. em-342 is a PBL course in which one must put in effort not only to benefit oneself but to benefit a group. I return, each person in the group benefits from not only their knowledge, but the knowledge of others.
- J. Being able to read an article, analyze and research it, and then convey the information.
- K. The essence of this course is the use of PBL to accomplish self-learning in the basic field of hemoglobin study.
- L. The course is designed to make you the teacher. You must find answers and seek understanding, it is not given to you.

- M. This class entails reading, discussing, and learning about hemoglobin and sickle cell anemia through articles of the way past scientists discovered and learned about it. Group discussion and participation is necessary.
- N. CHEM 342 is an introduction of biochemistry through the use of chronological scientific articles. It is a course that makes you formulate and answer your own questions.
- O. This course is different from most other courses you will take, it emphasizes problem-based learning, so you will be finding the answers to your own questions.
- P. This course is based on group discussions of biochemistry related articles and the questioning aspects in the article that facilitate learning.
- Q. Problem-solving by reading articles in groups.
- R. CHEM-342 is characterized by the in-depth analysis of biochemistry-related articles, through the use of self-driven cooperative groups. a cohesive whole than on memorization of unrelated facts. Success in this course depends more on one's ability to synthesize past and present knowledge in
- S. This is a group based class that emphasizes learning and forces students to both teach and grasp concepts based on some peer knowledge.
- T. Time consuming, you must be a self-motivated individual who is interested in Biochemistry and just seeking knowledge in all forms for the sake of learning. If you like/want something different and slightly challenging.
- U. A PBL course that uses scientific articles to uncover the history of hemoglobin and the investigation of variants of it.
- V. This class is about learning new stuff in teamwork and trying to understand the article rather than memorizing stuff individually for exams.
- W. A problem based learning course in which students work in groups to find information and share information from their findings, giving the group a large amount of information.
- X. A course that encourages personal research teamed with group discussion and learning.
- Y. CHEM-342 is all about hemoglobin, but you learn from reading the article. With a group, you solve your own problems without being lectured by a professor. You need to be able to communicate and be willing to admit if you don't understand something.
- Z. This course surveys hemoglobin, what it is, how it was discovered, and implications of its function.
- AA. A person who might consider CHEM-342 would be responsible, motivated, open-minded, okay with sharing information, and ready to put in a lot of work kind of student.
- BB. In this course, you will be asked to solve conceptual problems in an individual and group environment.

43. Identify or describe some thing(s) that Professor White does particularly well.

- A. Getting everyone involved; encouraging participation in the process, engaging curiosity.
- B. Elaborating
- C. Dr. White is always willing to meet with you outside of class to discuss anything you don't understand and careers. He also brings up questions and issues we often overlook that are important.
- D. Professor White is approachable and makes himself available through office hours and appointments. He makes sure to spend an equal amount of time with each group and tries to get to know his students.
- E. On the last day that we are going over the particular article, he goes over unresolved learning issues.; provides open-discussion environment; very interactive with each group.
- F. Communicates well; Manages class well; organizing the course (excellent).
- G. Dr. White is very clear that the majority of the work is done by the student and that his role is more as an observer than as a traditional lecturer.
- H. When asking Dr. White a question he will answer with a question that will help lead to an answer.

- I. Professor White puts a great deal of effort into this course. He does a good job of making sure all groups are on the right track to understanding the material and relates the material to other courses well.
- J. Coming around to each group once or twice during class keeps groups on pace and allows a question or two have and there
- K. Encourages – thought; self assurance, group reliance, consciousness at 8AM.
- L. Make you think; tells you enough to find answer but doesn't give it, very accessible.
- M. Takes time at the end of each article to discuss unresolved learning issues.
- N. Dr. White is very good at answering any uncertainty that I might have, but more when he answers questions he uses a visual that is extremely helpful. He is also very understanding when it comes to student frustration or lack of understanding.
- O. Professor White introduces important topics for class/group discussion and asks questions that lead to further thought and understanding in the group setting.
- P. The organization of the course is exceptional. After the first article, it was very clear what methods were expected out of the course. Professor White makes major concepts much easier to understand in the way he explains/questions things.
- Q. Knows a lot about topic of hemoglobin and can help understand how to think and apply information.
- R. Professor White is skilled at teaching without lecturing; he guides students toward conclusions rather than giving them quick-fix answers.
- S. I feel like he makes the class very inclusive to participation. Even if I wasn't completely sure about an answer, I wouldn't feel bad about throwing an idea out for class discussion. I like how he goes to each table and helps out in group discussion.
- T. Listens to concerns and guides well in conceptual knowledge of information/material.
- U. Professor White is always willing to help students in and out of class with their problems, even if it is not directly related to CHEMM 342.
- V. Keep the students focuses and on track. Help out students when needed.
- W. Interacts with each group during class and asks thought-provoking questions when listening.
- X. Encourage discussion.
- Y. He invokes deeper thinking into issues, and only offers information that would be hard for you to understand yourself. He's very helpful in guiding you in the right direction in class and outside of class.
- Z. Initiates though provoking conversations.
- AA. He is always prepared, grades things on time, pushes the class in the right direction, and makes you work hard and think.
- BB. Mediates the class, provokes thought, grades in a timely manner.

44. Identify or describe some way(s) that Professor White could improve his teaching (and your learning).

- A. Jigsaw group process didn't seem to work well, but I'm not sure how to change it. Perhaps it could be replaced by a group project with the regular group. (This may be colored by my own situation-I although my regular group was much more effective than the jigsaw group.)
- B. More lecture
- C. I think that some more lecturing would be very useful on the more complicated things discussed because often times even the tutors have no idea what the answer is or where to look.
- D. I realize this class is PBL, but I still feel that some lectures should be given. I also feel there is a lack of explanation when grades are given as assignments are often unclear. Sometimes there is evidence of favoritism of students.
- E. Give us basic concepts to look up and understand before reading the article and formulating learning issues.
- F. Maybe – introduce the basic idea of each article before staring it.

- G. In some cases I thought that student research wasn't especially valuable to understand hemoglobin. This was true especially during the very (early) articles trying to piece together outdated experiments
- H. Give summaries for important topics, not just learning issues-This will help students understand many points and not focus on subordinate issues.
- I. Professor White could spend more time reviewing articles before he introduces another one. I feel sometimes it was rushed.
- J. At first I thought it would be lecturing more but as the year went on I would lean toward more hands on group assignments, concept maps, abstracts, etc.
- K. Encourage interest in PBL (I'm not a fan, but I learned so much.)
- L. In some cases giving an answer would greatly help understanding.
- M. Dr. White could keep everybody focused on the most important concepts in each article if we do start getting off track.
- N. Possibly having more entire class discussion because it allows everyone to discuss and see where other groups stand.
- O. Providing concrete answers to learning issues that are shared by the majority of the groups.
- P. After each article I think it would be good to have each group summarize what they thought were the key points and share with the rest of the class. I think that that would really help with better understanding of articles. Sometimes all the details in the articles are overwhelming and with 4 other classes, I think that is sometimes forgotten.
- Q. You are very intimidating and I sometimes didn't want to talk in front of you because I didn't want to say something stupid, and I feel that you look down on people a lot more than necessary if they do not talk.
- R. I think the course should be extended from 50 minutes to 90. This way Professor White can visit each group more than once to ensure that each group understands the key concepts.
- S. Give summaries of the important aspects of the articles during wrap up.. Make sure all groups are around the same level of understanding.
- T. Allow more time for group discussion, emphasize the importance of feeling comfortable in your groups (its more important than you think for learning purposes.)
- U. I think that Prof. White should interact more with groups about their learning issues and also out of class assignments. Often, we were unsure of what he was looking for in some assignments.
- V. Give lecture before each article starts. (Just a little information about stuff we need to know for the article.)
- W. He could help my learning more by giving lectures about the material and showing the pertinent information and ideas on a PowerPoint presentation or on the board.
- X. Mini-lecture summaries of articles highlighting important points (~10-15 minutes) in addition to handouts/questions and answers.
- Y. There isn't much he needs to do outside of preparing us a little more for the exams.
- Z. Suggest textbook subjects to read along with the articles (i.e. the protein chapter in the biochem book would have been very helpful to read prior to Pauling's article.
- AA. He could handout LI's [learning issue lists] earlier. He can't do much though because its more of a self paced/independent class. Maybe he could see how the groups work, because I feel like my grades on the test didn't reflect my understanding of the material but I do well in class.
- BB. Sometimes explain certain things we're not expected to know.; provide clearer guidelines for grading; provide better understanding of expectations; and stress important concepts in jigsaw articles.

45. Reread the course syllabus and provide some thoughtful feedback. e.g. Did the syllabus adequately describe the course? Are there aspects of the syllabus that are unclear or misleading that should be revised? What is missing that should be included? Feel free to discuss this question with your classmates.

- A. Seemed fine; more informative than most; only confusing thing was to figure out which articles were online versus in course packet.
- B. Overall, the syllabus describes the course adequately.
- C. I feel that the syllabus is fine. It states the objectives, discusses the schedule, what PBL is, and all assignments. It is much more in depth than (for) any other class I have taken.
- D. More emphasis in the syllabus should be placed on the importance of attendance. I did not realize we would be penalized for being 2 minutes late. The class begins at 8 AM and sometimes it's difficult to get to class exactly on time.
- E. The syllabus accurately described the course. The website provided more than enough information about the class. I really can't think of any other way to improve the syllabus or the class.
- F. Syllabus-very thorough
- G. I thought the syllabus was fine.
- H. The syllabus did describe the course well. A great part about it is you are able to view old evaluations.
- I. I felt the syllabus was very informative. I liked how it described things and then provided links to the related assignment. I also enjoyed reading things from years past.
- J. Description correct other than not noting each article reviewed per group (aka jigsaw groups). The part about roles (recorder, task master, etc.) I do not think was used by any group. Otherwise syllabus very concise and does a good job at defining PBL.
- K. I thought the syllabus was fine.
- L. The syllabus is very comprehensive, I don't see a way to revise.
- M. I feel the syllabus accurately describes the course. Problem-based learning is clearly outlined and explained, which most of this course is based on. It could describe about the types of things we are learning about.
- N. The syllabus is accurate with its descriptions and the expectations that come with this class. There is no real understanding of how much assignments are worth in class (%breakdown); attendance is very important and that is not very clear.
- O. The syllabus was an accurate description of the course, providing helpful and relevant information that students can use to better understand the class.
- P. The syllabus clearly explains what is expected out of this course. However, I had never experienced a PBL course and was extremely nervous after reading over this syllabus before the semester started. PBL may need to be explained in a way that is not intimidating/misleading to students.
- Q. The importance of attendance
- R. Yes, the syllabus described the course. It would be difficult to accurately describe this course to someone who had never taken a problem-based learning course. The only unexpected element that caused problems was the dependence on knowledge gained in previous courses. Other courses do not require this to anywhere near the degree that this course does. I have not had a general chemistry course in 3 years and I feel my performance suffered a bit as a result.
- S. The syllabus did adequately describe the course. I liked the links to past course evaluations and old midterm and finals. I feel like the breakdown of the grading is somewhat unclear. How much are the learning issues, concept map, etc. worth?
- T. Yes, it described it well, you could emphasize personal responsibility/drive for the group-encourage outside learning of biochem. topics (you could add links about various interesting biochemistry topics of general interest.)
- U. I thought the syllabus was very helpful. I referred to it online often.
- V. I think you included everything required in this class in the syllabus.
- W.; Yes, the course syllabus accurately described the course. It accurately discusses working in groups and using the tutor as a resource.

- X. Course syllabus is good-a little lengthy, but I can see how it would be useful to some people.
- Y. Yes, it did. It gave us an idea of what we were exactly expected to do. There are no unclear parts of the course.
- Z. Yes the syllabus was a good description of the course. I did not notice any ambiguity in the syllabus. A link to the chemistry course homepage site would have been helpful.
- AA. The syllabus left no stone unturned. It didn't hide anything. I remember reading it before the first day of class and knew I would have a lot on my plate to handle and this would be no walk in the park. Answers to old exams would help A LOT! It was a bit wordy also.
- BB. For the most part, the syllabus was accurate. A better explanation of how much each writing assignment is worth could have been given.

46. Open Mic. Reflect on the course and identify those aspects that you like or think could be improved. Please suggest ways for improvement.

- A. Was a better experience than I expected; previous academic experiences with group projects/work was pretty dismal.; Something like concept map and lab experiment seemed a little contrived, although I understand why they were assigned (perhaps they could be replaced by something else) Just a thought, not a complaint.
- B. The jigsaw group is good, but insufficient time was spent on it.
- C. At times the class seemed completely useless because I felt that we did not accomplish anything. However, this occurred often because of not enough preparation or numerous group members being absent. I liked how the course taught me to think into things deeper and motivate myself to do work.
- D. Course assignment should be made more clear as explanations are not clear in some cases. More time should be devoted to lecture. Rather than groups formulating questions at the end of an article to ask Dr. White, he should instead ask the group pertinent questions, so we know what is important. Immersion in problem-based learning is difficult, especially when it is a subject like biochemistry. I also think it would be beneficial to change groups midway through the year.
- E. I like the problem-based learning aspect; I think some questions on the midterm had nothing to do with what we learned. I wish more problems were focused on the article read; One way to improve the class is to have a discussion period during the week. There doesn't seem to be enough time with the three 50-minute classes per week.
- F. Course was very well organized; maybe starting each article, give an overview; more ways for student to vote on at least 1 article they'd like to do, instead of instructor choosing all of them.
- G. I liked it, it took some getting used to but I found it extremely helpful and a unique experience despite preferring traditional lectures.
- H. I think this course helped me learn a great amount. It also kept me motivated at times to provide my group with the correct answer. It also helped me keep on (undecipherable word) because other people were relying on me and I work much better when I have that kind of pressure.
- I. [No response]
- J. The last week really put the year into perspective when Dr. Dow came and spoke. To be able to understand someone so knowledgeable so well really opened my eyes to what I've learned this year. For improvement, I think Dr. White should sometimes provide websites that are of use. Do not make any assignment for them but let the student explore them themselves for further knowledge.
- K. The course webpage/Dr. White's web page is very annoying to navigate. There should be a primary page with descriptive links to every other page (or something of the like).
- L. . A time later in the day would help; study guides for midterm and final, or at least some advice about what to study.
- M. Overall, PBL was a new and unique experience, but I think it would have been better if we spent more time, as a class, learning the overall, major concepts of each article. There were still some unresolved learning issues that we did not have time to talk about at the end of some articles.
- N. I think the setup at the class is the best way to learn and obtain the goals that CHEM 342 has set out to do.

- O. I liked the presence of the tutors, this was very helpful because they helped group discussion be more efficient.
- P. Overall I thoroughly enjoyed this course. It was difficult and time consuming, but worth it. It really sparked my interest in biochemistry. I think tutors should have all taken this class before teaching it. I noticed a difference between my tutors and my ability to comprehend material.
- Q. . Assignments were very difficult and grades do not reflect what students put into the papers, assignments. Seems like you graded easier for people who talked more.
- R. About the only thing that could have been improved was perhaps a warning about the amount of prior knowledge required by this course. Other courses expect rote memorization which inevitably leads to knowledge memorized being forgotten. I would have liked to have a week or two prior to the beginning of the semester to try and reteach myself everything I had forgotten from general chemistry, as once the semester began, it was too late.
- S. I would have liked to have the peer evaluations when we did them at midterm to know what I could have improved on. Make sure my group thought I was pulling my fair share. I did like how my group worked together, was a little scared at first how we'd work together. Did learn a great deal, furthered my research (PubMed, library, etc. ability. Can definitely read scientific articles better than ever before. Both tutors I had were very good.
- T. I wish there was a class in High School that had prepared us for a course like this-this was unlike any class I have ever taken. I think I learned just about as much as I did about myself and my learning habits as Biochem and hemoglobin combined. I'm actually still trying to decide if this course helped my confidence in my own abilities or just increased my anxiety of working in groups. But I do know that this class taught me a lot, and I can be confident in that.
- U. I liked the PBL format, but I think it got repetitive and tiresome the last few weeks of class and this caused people to lose interest and slack off. Perhaps having one class a week with a different format the last month of classes would help prevent this.
- V. This class is too early (I have lab at night on Monday and Tuesday and always get home late, 12ish.) That's why I had to miss some classes. The jigsaw group was not a good idea (personal thought). We learned one whole article in one week and learned the other three from other group members in a short period of time. I did not get to understand enough of those three articles.
- W. Less group activity and more lecture based class time should be more helpful to students. More visual learning should be helpful.
- X. I feel that there needs to be a better way to make groups members accountable-some individuals did not participate in discussion unless prodded; the same people rarely tried to understand and research they did and could not answer questions about it. Also, 8 AM isn't a great time.
- Y. I liked the problem based learning, because I was able to figure things out for myself. I learn much better that way than having a professor lecture to me.
- Z. I am very happy with the outcome of this course. I have learned more about science and thinking critically in this class than probably all the others combined. The only bad thing about the class was the early hour at which it starts but that may be just an inconvenience more than anything.
- AA. Didn't like waking up at 8 AM MWF and having to be awake and coherent in a group setting. The class time really put a damper on my spirits at first, but I did get used to it. Maybe if Dr. White or a tutor went over how to exactly read the article, like Stokes, step by step-the beginning would not have been so tough. Maybe having an online message board with students (different groups) learning issues and maybe answers so groups can see what other groups are focusing on. On a personal note, I don't really "get" PBL. I see how it prepares a student to learn themselves, etc. But why am I paying for a professor's class if he's not teaching me-I'm teaching me.
- BB. There needs to be a better understanding amongst group members as to what entails being a good "team player." Perhaps the tutors could explain this better. Also people should be allowed to chose their own groups.