

[The following pages contain the transcribed evaluations of all 20 students who completed CHEM-643 in the fall of 2004. The evaluations were done outside of class after the students had completed their case studies but before the final examination. This evaluation is very similar to the one used in this course in previous years. The 20 completed evaluations were arbitrarily assigned letters "A" through "I". Individual comments are identified by these letters.]

**CHEM-643 INTERMEDIARY METABOLISM**  
**FINAL COURSE EVALUATION**  
**Due Wednesday, December 8, 2004**

**Instructions:** *This is an anonymous evaluation to be completed outside of class. I will use your responses to revise the course before it is offered again. Therefore, please answer the following questions honestly and thoughtfully for the benefit of students who will follow you. Return the completed evaluation before class on Wednesday, December 8 to 116 Brown Laboratory. Make sure you check-off your name on the course roster there because I have no other way of knowing that you have completed this evaluation. For the narrative part of this evaluation, reread the course syllabus. Please return the Departmental "Short Response Form" course evaluation at the same time. Your responses will be read after the grades have been turned in.*

H. B. White

**(Circle one) I am an [undergraduate (13), graduate (7)] student.**

**1. During the first half of the semester, you worked on 7 different weekly problem sets listed in the table below. Rate each (put the number in the appropriate box) with respect to the following criteria:**

**A. Time devoted to it in hours-per-week outside of class.**

1 (<5)      2 (5-10)      3 (10-15)      4 (15-20)      5 (>20)

Homework Problem Set Assignment	1	2	3	4	5	Ave	SD
Inborn Errors of Metabolism	2	11	4	2	1	2.58	0.55
Review of Carbohydrate Metabolism	2	10	6	2	0	2.53	0.13
Lipid Metabolism	2	11	5	2	0	2.47	0.18
Reactions of HMGC <sub>o</sub> A	1	12	3	4	0	2.63	0.27
Biosynthesis of Essential Amino Acids	3	10	5	2	0	2.42	0.37
Riboflavin Biosynthesis	3	9	5	2	0	2.32	0.86

**B. Amount of thought required/intellectual difficulty**

Very challenging    1    2    3    4    5    Trivial

Homework Problem Set Assignment	1	2	3	4	5	Ave	SD
Inborn Errors of Metabolism	1	7	9	3	0	2.84	#NUM!
Review of Carbohydrate Metabolism	4	9	6	1	0	2.32	0.37
Lipid Metabolism	8	7	4	0	1	2.05	0.80
Reactions of HMGC <sub>o</sub> A	5	12	2	0	1	2.11	0.61
Biosynthesis of Essential Amino Acids	5	9	5	0	1	2.26	0.65
Riboflavin Biosynthesis	9	6	1	2	1	2.06	0.99

**C. Interest level**

Very interesting    1    2    3    4    5    Totally uninteresting

Homework Problem Set Assignment	1	2	3	4	5	Ave	SD
Inborn Errors of Metabolism	7	7	6	0	0	2.05	0.49
Review of Carbohydrate Metabolism	5	6	8	1	0	2.37	0.49
Lipid Metabolism	6	7	6	1	0	2.21	0.56
Reactions of HMGC <sub>o</sub> A	3	9	6	2	0	2.47	0.36
Biosynthesis of Essential Amino Acids	4	9	6	1	0	2.32	0.37
Riboflavin Biosynthesis	4	7	8	0	0	2.21	0.77

**2. Rate each case study assignments listed in the table below with respect to each of the following items: (Use successive columns for A - E)**

**A. Time devoted to it in hours-per-week outside of class.**

1 (<5)      2 (5-10)      3 (10-15)      4 (15-20)      5 (>20)

<b>A. Time per week</b>	<b>&lt;5 Hrs</b>	<b>5 to 10</b>	<b>10 to 15</b>	<b>15 to 20</b>	<b>&gt;20 Hrs</b>	<b>Mean</b>	<b>SD</b>
CS #1 Photosynthesis	4	9	5	1	0	2.158	0.81
CS #2 Folate Metabolism	3	9	5	2	0	2.316	0.86
CS #3 Amino Acid Metabolism	11	6	1	1	0	1.579	0.82

**B. Amount of thought required/intellectual difficulty**

Very challenging      1      2      3      4      5      Trivial

<b>B. Intellectual Challenge</b>	<b>Very Challenging</b>				<b>Trivial</b>	<b>Mean</b>	<b>SD</b>
CS #1 Photosynthesis	3	14	0	2	0	2.053	0.76
CS #2 Folate Metabolism	5	10	3	1	0	2.000	0.79
CS #3 Amino Acid Metabolism	4	11	4	0	0	2.000	0.65

**C. Interest level**

Very interesting      1      2      3      4      5      Totally uninteresting

<b>C. Level of Interest</b>	<b>v. interest</b>				<b>v. uninteresting</b>	<b>Mean</b>	<b>SD</b>
CS #1 Photosynthesis	8	8	0	2	1	1.947	1.15
CS #2 Folate Metabolism	9	4	3	2	1	2.053	1.23
CS #3 Amino Acid Metabolism	4	10	2	2	1	2.263	1.07

**D. Value in promoting group discussion and interaction**

Excellent      1      2      3      4      5      Poor

<b>D. Value for Discussion</b>	<b>Excellent</b>				<b>Poor</b>	<b>Mean</b>	<b>SD</b>
CS #1 Photosynthesis	9	9	0	1	0	1.632	0.74
CS #2 Folate Metabolism	10	5	3	1	0	1.737	0.91
CS #3 Amino Acid Metabolism	5	8	4	2	0	2.158	0.93

**E. Provide an overall ranking (1, 2, 3, 4) of the assignments. (Note this is a different scale that used on items A - D.)** If there are any that you feel should **not** be used in future offerings of this course, please put a circle around the rank number(s).

Explain any circled assignment in the space below the table.

<b>E. Ranking</b>	<b>1st</b>	<b>2nd</b>	<b>3rd</b>	<b>Mean</b>	<b>SD</b>
CS #1 Photosynthesis	7	8	1	26	1.625
CS #2 Folate Metabolism	9	4	3	26	1.625
CS #3 Amino Acid Metabolism	1	3	12	43	2.688

**2. Consider the following items and rate them with respect to how important they are for success in CHEM-643.**

Item	Extremely Important	Very Important	Reasonably Important	Slightly Important	Not Important	Mean	Std Dev	Q#3
a. Personal Initiative	11	8	0	0	0	1.42	0.49	4
b. Library Research Skills	6	10	3	0	0	1.84	0.67	5
c. Taking Notes in Class	2	10	5	1	1	2.42	0.94	0
d. Writing Skills	3	11	5	0	0	2.11	0.64	6
e. Multidisciplinary Synthesis	3	9	6	1	0	2.26	0.78	2
f. Collaboration with Classmates	5	8	5	1	0	2.11	0.85	13
g. Oral Communication Skills	5	6	5	3	0	2.32	1.03	3
h. Logical Analysis	8	10	1	0	0	1.63	0.58	7
i. Prior Knowledge	3	5	9	2	0	2.53	0.88	2
j. Memorization	0	3	7	6	3	3.47	0.94	1
k. Learning New Information	12	6	1	0	0	1.42	0.59	2
l. Problem Solving Skills	11	6	2	0	0	1.53	0.68	10
m. Conceptualization	12	6	1	0	0	1.42	0.59	6
n. Accessing the Internet	4	9	5	1	0	2.16	0.81	3

**3. Consider the items in question 2 again in relation to other science courses. Circle those items that, in your experience, are more important in CHEM-643 than in most other science courses you have taken. Circle as many items as are appropriate.**

**4. On average, I spent \_\_\_ hours a week outside of class on work related to CHEM-643.**

**Average =  $8.37 \pm 4.64$  h/wk**

**Range 3-20 h/wk**

**For each statement, 6 through 27, put a check in the box that best reflects how strongly you agree or disagree with each.**

Statement	Strongly Agree	Agree	No Opinion/ Undecided	Disagree	Strongly Disagree	Mean	Std Dev
6. My group made an effort to meet together at least once a week outside of class.	0	1	3	9	6	4.05	0.83
7. I found working on case studies to be a valuable learning experience.	4	13	1	1	0	1.95	0.69
8. I think peer evaluation within groups is a worthwhile activity.	2	8	6	1	1	2.50	0.96
9. Based on things I learned this semester, I would really like to learn more about intermediary metabolism.	5	11	3	0	0	1.89	0.64
10. Instead of case studies and group work in the second half of the course, Dr. White should have lectured for the whole semester.	2	0	5	8	4	3.63	1.13
11. The assignments I turned in were graded and returned promptly.	15	4	0	0	0	1.21	0.41
12. A considerable amount of the material in CHEM-643 reviewed material I had in other courses.	1	2	3	12	1	3.53	0.94
13. I personally learned a lot researching my case study topic.	8	8	2	1	0	1.79	0.83
14. I found the work load in this class to be excessive.	1	8	4	6	0	2.79	0.95
15. My grades on the assignments reflected the skills and knowledge I have developed in this course.	3	5	6	4	1	2.74	1.12
16. I frequently talked about topics from this course with friends and other people not taking this course.	6	6	4	3	0	2.21	1.06
17. I feel confident in my ability to learn what I need to know to understand issues in intermediary metabolism.	3	13	2	1	0	2.05	0.69
18. I would prefer that the course had a PBL format for the entire course rather than just the last half.	1	1	3	11	3	3.74	0.96
19. The wireless laptop computers were a useful resource in the classroom.	8	10	0	0	1	1.74	0.91
20. Other members of my group did their fair share.	9	9	0	1	0	1.63	0.74
21. The instructions on writing a case study problem were insufficient guidance for me.	2	6	3	6	2	3.00	1.21
22. I would prefer if this class met in the late afternoon.	0	3	8	5	3	3.42	0.94
23. I frequently referred to the course web-site for information.	7	10	0	2	0	1.84	0.87
24. Constructing a concept map was a good group assignment.	7	3	4	3	2	2.47	1.39
25. I found Dr. Shoemaker's visit to the class interesting.	7	10	2	0	0	1.74	0.64
26. I would recommend this class to other students.	7	9	3	0	0	1.79	0.69
27. I would recommend Dr. White as a teacher to other students	11	8	0	0	0	1.42	0.49

**28. In a sentence or two, describe or characterize CHEM-643 to someone who might consider taking the course.**

- A) The ins & outs of metabolism once glucose is ingested.
- B) Chem 643 is a course designed to make metabolism understandable conceptually. It makes you understand and recognize biochemical patterns rather than memorize facts.
- C) This course requires a lot of work and devotion. However you will learn!
- D) Chem-643 is a course that pulls together a lot of things in chemistry most people think they are knowledgeable, but at a closer look, the course shows how much you don't know.
- E) This course is a very challenging synthesis of the concepts learned in CHEM 641/642 & organic chemistry presented in a new way. It is not for the faint of heart.
- F) Overview of Intermediary metabolism with emphasis on diseases resulting from errors in metabolism.
- G) The course shows a really good basis for intermediary metabolism. Be expected to do a lot of outside of class work.
- H) Intense PBL class on metabolism in which material is covered very quickly.
- I) An overview of intermediary metabolism
- J) You will learn the key points in metabolism, such as the role of some key vitamins, AA synthesis, FA oxidation, TCA cycle, etc.
- K) A class on metabolism which focuses on the integration of several pathways
- L) [No response]
- M) The course looks at different biochemistry topics from interesting perspectives and requires some writing.
- N) This course contains more information than possibly acquired in a semester. Keep you sanity; you'll learn more than you think.
- O) Class focused on understanding the basics of metabolism but also gain a sense of collaboration with others.
- P) This is a course in intermediary metabolism that is half taught with lecture and half with PBL.
- Q) CHEM 643 is half lecture, half PBL. A hard course, but I learned a lot.
- R) Course on metabolism with little emphasis on memorization.
- S) —very interesting course. Do not take if you have a hard course load. Definitely worthwhile.
- T) Very interesting, but more directed to biochem students. I'm really glad I took it.

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

- A) —Gets you to think
  - Organizes your thought track
  - Knows structures
- B) He piques interest about a topic that is otherwise obscure, and prods students in the direction they need to go on PBL problems w/o giving the answer.

- C) Relating Biochemistry to the real life.
- D) He is very knowledgeable. He is very good at facilitating discussion in a group when the group may think it has exhausted a topic.
- E) He is a good lecturer! He is also very good about returning assignments in no time.
- F) Well organized class  
encourages class involvement  
emphasizes understanding not memorization.
- G) He focuses on understanding the basic concepts and concepts that relate to all pathways of metabolism
- H) Encourages group participation
- I) He initiates critical thinking
- J) Encourages class participation  
Finds ways to relate to all in the class  
Willingness to help your learning
- K) He challenges us to find & learn the info rather than just shoving it down our throats
- L) [No response]
- M) good organization, grade assignments w/ lightning speed
- N) • Knows everything  
• Attempts to make the subject interesting & fun.
- O) Professor White really challenges you and gets you to figure out things on your own instead of giving you the answers.
- P) Interject with interesting facts/trivia/stories that are related to compounds or topics being studied at the moment.
- Q) Dr. White challenges every single student in the class.
- R) Sparks discussion w/in a group
- S) —Very good at explaining things and he is knowledgeable on a wide range of facts.  
—Molecule of the day was always very interesting
- T) Encourages discussions, thinking and interactions among students; very knowledgeable.

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

- A) —Give a little more direction or summary with case studies  
—Provide an answer key or go over homeworks
- B) Continue to write interesting and challenging studies.
- C) [No response]
- D) In the beginning, the lectures were difficult to follow because the lack of assigned literature. If he were to assign (/or references of interest) in conjunction with the problem sets, that could help.

- E) The in-class pauses at posed questions are everyone's fault. No one wants to speak up in fear of being wrong. More lecture, perhaps by changing the last 3 case study assignments into independent homework assignments.
- F) More structure in terms of the case studies meaning more emphasis on specific aspects as you go through the case study like a 10 min discussion at the end of each class about the important aspects of each part.
- G) Make sure the whole group understands what should be learned from a case study by not asking just one person in the group but all.
- H) I think the first half of the semester moved much too quickly. One class per topic was rough.
- I) Provide answers to the problem sets in the first part of the year
- J) I personally enjoy the lecturing half of the class. The PBL was a very new teaching method for me, and not that it was bad, I believe we could have covered more metabolism in that allotted time. I would continue to encourage student/teacher interaction, Dr. White is very good at this.
- K) [No response]
- L) [No response]
- M) [No response]
- N) • Sometimes just tell someone the answer when they feel they've struggled enough.  
• Go easy on the undergrads.
- O) [No response]
- P) Try not to get frustrated when students don't remember the details of concepts introduced a class period earlier. (It's a lot to take in, especially at first.)
- Q) [No response]
- R) [No response]
- S) —none
- T) Some assignments were not 100% clear in the questions. It needed a little more information. Answers for problems could be available in the web page

**31. 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) The syllabus was very clear & helped illustrate what was expected.
- B) Except for not having an "interview," I feel that the syllabus adequately describes the course and all that is required from the students.
- C) [No response]
- D) I think the part about case study is unnecessarily intimidating. I'm not sure how you would change it, but maybe convey its usefulness.
- E) I knew what to expect from 342. The syllabus is fine.
- F) The syllabus was very helpful.
- G) The syllabus was very reflective of what was expected from the course except the amount of time spent outside of class.



- H) Everything was accurate.
- I) [No response]
- J) Syllabus is fine
- K) The syllabus does adequately describe the course and it is without unclear or misleading information.
- L) [No response]
- M) Under "Selection of Case Study Topics" it still reads "Your case study problem & your discussion of it with me are essentially your final examination"
- N) The syllabus was ok . . . perhaps it should describe how much work this course will be.
- O) I think the syllabus was written very well. I knew exactly what was expected
- P) It would be useful to provide students with a rubric or general list of things you're looking for when grading problem sets. (I think some students weren't expecting such low grades on the first assignments.)
- Q) The case-study was perhaps too open-ended. It was difficult to figure out exactly what was required.
- R) [No response]
- S) --unclear whether grade is earned in the class by a point system or determined by whether teacher "likes" you or not
- T) There is a lot of information, very helpful.

**32. To what extent did you find the CHEM-643 course web-site useful? How frequently, and in what ways did you use it?**

- A) Any time I had a question, the website was the first place I went.
- B) The website was very useful to check dates of assignments, assignment description/instructions, and to check and see where the course was headed next.
- C) I would always visit the website, it is a nice resource for other links.
- D) Very useful. I visited it every time I did work for access to pathways.
- E) It was useful in its links to references regarding homework assignments, pathway databases, and how to write a case study for me personally.
- F) The course website was helpful for me for viewing deadlines, assignment and the pathway links were helpful.
- G) There were useful pathways available for the 1<sup>st</sup> half of the course, and the schedule was always updated when necessary.
- H) I printed everything (excluding inactivated assignments) before class even started, so I accessed only to print assignments
- I) Very useful
- J) I find it difficult to remember to go there and download the information, I am slow to adopt this paperless society. When I used the website, I used it to download assignments, use links, and keep up with the current assignment.
- K) The web site is very useful, I often utilized the site to explore the many links so that I could refine my own research efforts
- L) [No response]

- M) I referred to the case study checklist and links for tips on referencing
- N) I really only used it for due dates of assignment & to print out homework.
- O) I found it useful especially the metabolism handouts. I used the website at least three times a week.
- P) I found the website very useful and referred to it at least twice a week to look at the syllabus and course schedule. I used it heavily in the 1<sup>st</sup> half of the semester for metabolic pathway diagrams.
- Q) It was very helpful, especially the metabolic pathway sheets.
- R) I never used it.
- S) —Very organized, everything is there that we need  
—used it all the time for quick reference
- T) I bookmarked and used all the resources, from metabolic pathways to tips for the case study PBL problem.

**33. Reflect on the course and identify those aspects that you think could be improved. Please suggest ways for improvement.**

- A) At the end/middle of each case there should be a lecture to make sure everyone is on the same page.
- B) I enjoyed the course thoroughly. I cannot think of any real improvements. I was uncomfortable at first with the open ended nature of the case study/PBL assignment, but that should remain as it is to teach thought independence.
- C) [No response]
- D) The problem set were very tough and rapid. If there was a way to space them out more or have a review sheet that goes over the problems.
- E) —Maybe if we could pick our own group  
—All lecture, more homework problems
- F) More direct “This is what you should take away from the case studies”
- G) Shorter or less tedious homework assignments
- H) This class required much outside time. As an undergrad it was intense at times, but nonetheless very interesting material.
- I) Keep class size small to allow for final interviews. Remove midterm and final exams
- J) Though PBL is interesting, one assignment would be adequate for the teaching method example.
- K) [No response]
- L) [No response]
- M) [No response]
- N) Although it's mainly a wish, because of the nature of the course, take less emphasis on grades & let students focus more on the material. Not to suggest that grades should just be given out . . . but perhaps allow students to be graded based more on their effort on the class work. What do I know?
- O) More time to work on homework assignments in class

- P) I felt like we went through case studies too fast toward the end of the semester. It was harder to stay interested to keep up because everyone was getting burnt out and had many other project/finals to worry about.
- Q) Concept maps seem to teach well, but I think they are more cumbersome to construct. The difficulties were in construction, not learning the material.
- R) I felt that the case study assignment was not very useful and I did not get anything out of it. I would suggest some other assignment.
- S) —more ways need to be developed to get everybody involved in the class. It seems that only a couple of people were targeted, especially at the beginning of the semester and they may feel bad about getting something wrong when a lot of people didn't even try.
- T) Some points studied in detail (folate), but did not go through other vitamins. Other topics such as nutrient transport and absorption could be studied. Since students have to learn and search on their own, the workload and time need are not small.

**34. "Open mic"—Anything you want to add that you haven't said yet.**

- A) [No response]
- B) Great course! I wish more of my courses could be PBL. Please encourage your colleagues to start incorporating a PBL format.
- C) I found it a little difficult to learn a whole lot from the folate case study. I like the concept map however it was more one person putting together the map. This may be b/c my group used Inspiration to construct the map so we didn't do a whole lot of connecting concepts and ideas on paper in an organized fashion. Using inspiration we were able to type in a whole bunch of words/bubbles before every connecting anything. And really only one person sits at the computer to do the work while we watched.
- D) This course was one of the toughest yet most rewarding classes I have taken. I am not a morning person, but the course has/had me excited to come to class. It showed me why I chose the major I choose. Thank you.
- E) [No response]
- F) I liked the class.
- G) I liked the class, it was very informative and I think I learned a lot.
- H) The freedom to choose any topic for the case study was great. I enjoyed that assignment because my aspiration is to be a professor, so it was good practice in lesson planning
- I) [No response]
- J) I liked the lectures, wish we had more. Though the homework assignments are challenging, time consuming, and thought providing; it is an excellent way to re-emphasis the lecture and encourages thought. I also enjoyed writing most of the case study, due to researching topics that I had prior interest. PBL/case studies are odd for me. Certainly a new way of trying to learn, (though looking forward, it is impossible to see the final direction that the case study will take) one example of this method would be plenty for me. One thing that was nice

was putting some names with some faces that I had spent a year of class with and did not know their names. I enjoyed taking this course. Thanks.

- K) [No response]
- L) [No response]
- M) [No response]
- N) I don't think I've ever worked so hard for a B before. On one hand, I feel like I've learned a lot of biochemistry while on the other hand, I feel like I didn't meet your expectations. Hopefully, I'll have gained what I think I have & be able to apply it later in my career.
- O) I didn't think I was going to like this class b/c there is a lot of organic chem. However, I really enjoyed this class and I learned a lot.
- P) I really liked the lecture and PBL mix of the course. I felt that the lectures and problem sets were very important for me to ensure a baseline of material learned, and developing my thinking in terms pathways that were need for the case studies. All lecture might be more boring for students, but I think all PBL would be a difficult way to get everything in you want to.
- Q) I greatly enjoyed the lecture part of the course. I learned more that way. However, I also like the switch to PBL, a fresh start, like the start of a new course.
- R) [No response]
- S) —I didn't like the concept map part of the class. I can't honestly say that I learned much from this. To construct a concept map you simply have to relate everything w/o always knowing the mechanisms of action or why certain things happen.
- T) [No response]