

**CHEM-643, Intermediary Metabolism, Fall 2012**  
**Final Instructor Evaluation - Numerical Responses (34/35)**  
**HAROLD B. WHITE – Instructor**

Anonymous on-line Course evaluation conducted before final examination

**QID 3425** - The instructor demonstrated thorough knowledge of the subject matter.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total:</b>		
Scale text						34 / 35		
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean:</b>	4.97	<b>Std. Dev:</b> 0.17
Total	0	0	0	1	33			
Percent	0%	0%	0%	2.9%	97.1%	<b>Median:</b>	5	<b>Mode:</b> 5

**QID 3426** - The instructor presented the materials in an interesting way.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total:</b>		
Scale text						34 / 35		
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean:</b>	4.47	<b>Std. Dev:</b> 0.62
Total	0	0	2	14	18			
Percent	0%	0%	5.9%	41.2%	52.9%	<b>Median:</b>	5	<b>Mode:</b> 5

**QID 3427** - The instructor encouraged class participation.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total:</b>		
Scale text						34 / 35		
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean:</b>	4.76	<b>Std. Dev:</b> 0.50
Total	0	0	1	6	27			
Percent	0%	0%	2.9%	17.6%	79.4%	<b>Median:</b>	5	<b>Mode:</b> 5

**QID 3430** - I would recommend this instructor because of his/her teaching to others considering taking this course.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total:</b>		
Scale text						34 / 35		
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean:</b>	4.35	<b>Std. Dev:</b> 0.92
Total	0	2	4	6	20			
Percent	0%	5.9%	11.8%	23.5%	58.8%	<b>Median:</b>	5	<b>Mode:</b> 5

**QID 4332** - The instructor's lectures were well organized.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total:</b>		
Scale text						34 / 35		
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean:</b>	4.35	<b>Std. Dev:</b> 0.73
Total	0	1	2	15	16			
Percent	0%	2.9%	5.9%	44.1%	47.1%	<b>Median:</b>	4	<b>Mode:</b> 5

**QID 4333** - The instructor was helpful if you sought help outside of class. (Don't respond if you didn't.)

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total:</b>		
Scale text						30 / 35		
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean:</b>	4.63	<b>Std. Dev:</b> 0.72
Total	0	1	1	6	22			
Percent	0%	3.3%	3.3%	20%	73.3%	<b>Median:</b>	5	<b>Mode:</b> 5

**QID 4334** - Overall, the instructor was effective in facilitating your learning of the material in this course.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	1	0	2	11	20	<b>Mean:</b>	4.44	<b>Std. Dev:</b>	0.86
Percent	2.9%	0%	5.9%	32.4%	58.8%	<b>Median:</b>	5	<b>Mode:</b>	5

**QID 4648** - I would recommend Dr. White as a teacher to other students

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	1	1	4	6	22	<b>Mean:</b>	4.38	<b>Std. Dev:</b>	1.02
Percent	2.9%	2.9%	11.8%	17.6%	64.7%	<b>Median:</b>	5	<b>Mode:</b>	5

**CHEM-643, Intermediary Metabolism, Fall 2012**  
**Final Instructor Evaluation - Narrative Responses**  
**HAROLD B. WHITE – Instructor**

**Question ID: 3435 - Comment on the instructor.**

Responses (26 out of 35)

- I think Dr. White is one of the best teachers I know- and that is saying something because both my parents are teachers. I think the style of the course was amazing and Dr. White is one of the few professors that will admit if he doesn't know something. Additionally, the times that he doesn't know something rarely come up. He is so knowledgeable and just awesome.
- He really cares about the students and the subject matter. I really like his PBL style- it is hard in the beginning but once you understand how it works, it is extremely helpful.
- He is a great instructor and very nice.
- Although he is really nice and seems like he wants to help, I don't think he does a good job teaching the class. The material was extremely challenging and his method of "self teaching" seemed to be grossly inadequate for the depth and substance of the material. I used the same text book in Chem641 and it seemed like in this class we were just asked questions in greater detail from the same text book, only Professor White didn't teach it to us, he just handed us the problem and the book and told us to have at it.
- Dr. White is one of the few professors that I have had over the past four years who is available to answer questions at all times while he is in his office. He is truly dedicated to his students and to making sure that we understand the material that he teachers rather than rote memorization.
- Prof. White struck a great balance between guiding the learning process and encouraging students to motivate themselves to learn.
- I felt that Dr. White challenged his students to push themselves beyond their comfort level when learning.
- Dr White is probably one of the best teachers I have had at UD. The PBL learning style

he follows is definitely more challenging than just going to lecture because it forces us to THINK more. I am not exactly sure how Dr White does it, but he has a way of causing his students to try their best for him. For instance, the first paper we wrote did not have a recommended length. I ended up writing a 9 page paper on the topic, encouraging myself to go more in depth about anything I had uncertainty about because I had assumed that is what he wanted, because he does have such high expectations.

- Dr. White's teaching method is good, but challenging at times because he really stresses learning the material instead of just memorizing. If you put the time into the course, and really focus on this style you will succeed.
- As always, Dr. White's courses challenge students to think outside the box and apply knowledge from multiple sources. He understands how to effectively engage a class and help it to obtain an understanding in its own way. He has been the most valuable resource to me in my college career.
- Dr. White is a good teacher and I understand the benefits to a PBL style, but I felt that we never got concrete answers to the PBL problems. This was especially hard for the quizzes because the quizzes did not accurately reflect what we learned in class. I think there needs to be a bit more lecture time to ensure complete understanding and not just a 5 minute overview at the end of class.
- Instructor was always available outside of class for further assistance on problems and preparation for exams .
- Dr. White is an incredible professor. I am TERRIBLE at biochemistry, and even after taking 641 I did not understand it at all. But through his PBL approach I have really developed a deeper understanding of the subject, which is something I never expected to have.
- Dr. White is an outstanding professor. He promotes critical thinking and emphasizes understanding over memorization.
- Keeps class interesting, emphasizes understanding of material.
- Emphasizes independent learning and collaboration among classmates. Would work better if everyone were a graduate students because a lot of people in the class simply don't have anything to offer to the more talented students.
- The instructor was very helpful, very knowledgeable, and encouraged the students to go to him with questions. He also held a review session for the midterm and stayed until all of the questions were answered (a few hours).
- The lectures can be a bit fast, but cover the material thoroughly. Very high expectations for his students, and most people rise to meet them.
- Great teacher. helped you understand material rather than memorize, encouraged working through problems using group work.
- Very opened to questions and comments.
- Dr. White is very approachable and willing to help, but can be vague when it comes to answering some questions. While this does help to get you to think more, it can also be confusing when you really can't figure out the answer.
- Shows a lot of interest in his students which is a breath of fresh air. Some professors here don't always seem to show this kind of behavior.

- Dr. White is a really nice guy who has a genuine interest in his students and passion for teaching. His assignments are thoughtful and interesting; they connect what we're learning to a relevant context. It is clear that he puts effort into his class and tries to make it as effective as possible. Often times professors' lectures feel slapped together and their slides contain very little information. This is never the case with Dr. White.
- Dr. White was good. He knows what he's doing.
- Dr. White is interesting. His style of teaching can be both good and bad. I like the feeling and understanding I get from learning the material through my own research. But I don't like when I lack the time necessary to do this research. Sometimes I wish he would provide us with more lecture material. His tests are only related to what we have learned. In many ways I feel that he expects us to make too many connections regarding the subject without explicitly stating them
- Dr. White is always available to help students outside his class. It is a rare event to see his office door in a main hallway in Brown closed. He has a way of teaching small components of metabolism so that a month later you hit yourself in the head feeling stupid for missing the big picture that was made obvious by his presentation of the material and you were just too ignorant to see.

**Question ID: 3608 Identify or describe some thing(s) that Professor White does particularly well.**

Responses (29 of 35)

- Everything. I really can't even put it in to words. I think he is a genius. One thing I really like is that if you ask a question he won't just tell you the answer- he will help you figure out the answer. This really facilitates learning because you don't forget things you reasoned through.
- He is very good at making analogies to non-biochemical processes in order to make the biochemical processes more understandable. PBL is extremely helpful in getting you to really understand something. He is really good at stopping superficial knowledge of things.
- He is a great teacher. He is very smart and helped students look at topics from new perspectives.
- He knows a great deal about the subject and can answer any question. He is very approachable. He has interesting case studies and scenarios.
- Prof. White always makes sure that any questions he is asked are answered to the asker's satisfaction. I don't think anyone was ever unsure about how he responded to questions in class.
- He sparks critical thinking and helps groups come to interesting conclusions about the subject matter being learned
- Forces us to think and question and research rather than just read and accept. I have seen these skills translate to other courses.
- Very helpful and available outside of class and I really enjoy the group work that comes

along with PBL.

- He forces you to go beyond memorization and actually understand and make connections with all the material.
- The prior comment can be applied here. His assignments are challenging and his use of group work allows students to come to an understanding of material in his/her own way and use the resources of a group to aid in that process.
- PBL. I liked the format and the way he organized the class. Great professor.
- He really gets you to think about things in a new way.
- He allows his students to think through problems instead of simply providing the answers. Problem based learning allows his students to interact with one another and learn from each others different views on the subject.
- His problem based learning approach is the best way of teaching I have ever encountered in this university.
- Dr. White is very good at teaching things in a way that promotes retention of information and understanding of concepts. His class taught me new ways to approach problems. Though frustrating at times, I can appreciate the end result.
- Using original real world examples of material. Group work combined with lecturing worked well.
- Shows students how to be resourceful in obtaining new information.
- Dr. White is very good at enabling the students to answer their own questions by prompting them to think about things they have already learned.
- Explaining information in a way that was easy to grasp
- The group learning process can be very productive when the group is functioning well. The exams focus strongly on understanding the material rather than memorizing.
- He questions people in a way to make them realize the answer themselves, which is better for understanding information and for remembering information. His problem sets, POGIL activities and case studies were extremely well organized to facilitate learning and understanding.
- - engage students with the course - homework assignments were pretty awesome
- Dr. White is very capable at helping students to see the whole picture of metabolism rather than memorizing specifics. It was much easier to figure out how different metabolic reactions occur when you are able to understand general aspects of biochemistry.
- really good at using analogies to describe certain concepts. Very creative in his use of description sometimes using visual imagery to describe processes that are more abstract than others.
- Dr. White makes his assignments (problem sets, case studies etc...) appear like big puzzles. Puzzles are always fun to solve and I frequently found myself so motivated to find the answer that I almost forgot I was doing an assignment. I agree 100% with his belief that finding the answer is as important as knowing it. Finding the answer myself taught me how to think through a problem rather than how to remember its solution. In addition, there were essentially an endless amount of practice problems to do. Because of

this, I was prepared to think about any new information presented to me.

- Grading and returning assignments inhumanly quickly.
- Points out holes in knowledge during PBL.
- He's incredibly smart. When he sits with a group and talks one on one, I feel like I'm learning the most.
- ORGANIZE BRILLIANT PROBLEM SETS. Each problem set is pure cleverness in the way that it combines learning about intertwining metabolic processes and pathways in a homework assignment.

**Question ID: 3609 - Identify or describe some way(s) that Professor White could improve his teaching (and your learning).**

Responses (26 of 35)

- Go over the answers to PBL. It's easy to think you get it when you really don't.
- I wish we did not have assigned seats when he is lecturing. I was put all the way in the back and I couldn't see the board and the pathways are really hard to follow on the board from that far away. Also, it would be helpful if he could post some answers to things online. It is hard when you are working solely in a group if your groups answers are correct. If not posting answers, going over them in more depth in class.
- I think more lectures would be helpful.
- He needs to lecture much more and provide practice questions with an answer key. If he printed slides of his lectures or provided some sort of blueprint for his lesson plan other than "facilitating" group discussion, I would have learned a lot more.
- I think Dr. White could be more mindful that some of his students may not be visual learners and may have difficulty following some of his lectures as a result. It may be more beneficial for him to identify those students and see if there is a different way he could present the material to them in office hours rather than changing his lecture style.
- Sometimes i felt hesitant to approach him with concepts I did not understand.
- Sometimes it can be frustrating when all you want is to know the answer and you know Dr White knows but he wants you to look it up and come to your own conclusion. But then again, I guess that is science. sometimes the exact expectations of an assignment are unclear and open ended. I presume Dr White does this intentionally but if you are unfamiliar with his teaching style (just research anything and everything until you have some understanding and even more questions than when you started) that it could be difficult.
- Not entirely sure. Many things are provided on his website, along with helpful links. We had a few power points in class and maybe putting that information on the course website or emailing it out would be beneficial.
- Be more clear on what chapters in the text book students should focus on.
- Review of homework assignments.
- More lecture.
- He can improve by giving more sample questions and guidelines of how to study for his

exams . I would like an outline of what to prepare for midterm and final exams.

- I think that there should be more structure for what the midterm and the final will be on. Some of the fill in the blank questions on the midterm I felt like I wouldn't have known based on the lectures but I knew them based on old exams.
- I liked the challenge that weekly problem sets provided. I felt I learned a great deal by solving the difficult problems. I think I would learn more/retain more if there were more problem sets throughout the semester.
- Nothing I can think of. Besides making the tests a little bit easier, not to inflate grades but they are especially difficult to prepare for. Maybe providing more guidance than just old exams.
- More lecture and closer attention to who is contributing to group work.
- I think the class would be better if the students were able to choose their own groups. I think that having a tutor in 342 helped students to stay on task, but when you are working with people that aren't as interested in the topic as you are and there is no one to keep everyone on task it is difficult to solve a problem. Therefore I think if students could choose their own group they could pick people that they know they work well with and will be successful in working through problems within that group.
- Not overwhelm with information/ assignments.
- I think that Dr. White's method of teaching is, by far, the best way for the students to learn. That being said, I think that having to turn in learning issues with each case study would be helpful.
- nothing, I absolutely loved the lecture, which was quite different from CHEM342. But both course was effective and interesting.
- Some classes where Dr. White would lecture instead of us working in groups didn't always feel organized. It felt like some lectures came out of no where with no background or transition on how this information relates to other lectures.
- pretty straight forward.
- I would have liked it if he reminded us of the syllabus a little bit more. For example, at the end of class a reminder like "next class we will learn \_\_\_\_\_. Remember to bring a metabolic pathway sheet from the website" would be nice. I found lectures a bit hard to keep up with because I was trying to draw the structures and listen. Dr. White did remind us to use the pathway sheets from time to time, but I would like it if he told us which one to bring for next time.
- In my opinion, group work (which was heavily emphasized in this course, it seemed to me) is better for reinforcing material which has been taught, but it was used in significant part to introduce new material at the initiative of the students from their own resources. But if I wanted to learn this stuff from Google, I could really manage most of that without taking a course.
- Let the students know what is important to study for tests. I studied a lot of information for the midterm that was completely irrelevant. This is the only class where I'm truly lost when it comes to studying. Often his test questions bring up things that we never discussed in class. I can learn the material and make connections, but I need some sort of guidance regarding what connections and information he wishes us to extract from class.

- I understand that a large component of the course is self-teaching, but I think it would be helpful to just delineate exactly what students should be learning, especially towards the end of the semester when working on the group project.

**CHEM-643, Intermediary Metabolism, Fall 2012**  
**Final Course Evaluation - Numerical Responses (34/35)**  
**HAROLD B. WHITE – Instructor**

Total = Responded / Enrolled

**QID 4329** - The course was well organized.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>			
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>		
Total	0	0	4	15	15	<b>Mean:</b> 4.32	<b>Std. Dev:</b>	0.68
Percent	0%	0%	11.8%	44.1%	44.1%	<b>Median:</b> 4	<b>Mode:</b>	4.5

**QID 4330** - The course textbook was very useful.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>			
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>		
Total	0	3	4	11	16	<b>Mean:</b> 4.18	<b>Std. Dev:</b>	0.97
Percent	0%	0%	8.3%	29.2%	62.5%	<b>Median:</b> 4	<b>Mode:</b>	5

**QID 4331** - The course examinations emphasized understanding of the material.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>			
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>		
Total	0	1	3	10	20	<b>Mean:</b> 4.44	<b>Std. Dev:</b>	0.79
Percent	0%	0%	0%	8.3%	91.7%	<b>Median:</b> 5	<b>Mode:</b>	5

**QID 3419** - The course emphasized understanding of the material rather than memorization.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>			
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>		
Total	0	1	1	7	24	<b>Mean:</b> 4.64	<b>Std. Dev:</b>	0.70
Percent	0%	0%	0%	12.5%	87.5%	<b>Median:</b> 5	<b>Mode:</b>	5

**QID 4650** - I am a(n) \_\_\_\_\_.

Scale text	<b>Undergraduate</b>	<b>Graduate Student</b>	
Scale value	<b>A</b>	<b>B</b>	
Total	31	3	<b>Total 34 / 35</b>
Percent	91.2%	8.8%	

**QID 4651** - On average, I spent X hours a week outside of class on work related to CHEM-643.

Scale text	<b>&lt;3 hr/wk</b>	<b>3-6 hr/wk</b>	<b>6-9 hr/wk</b>	<b>9-12 hr/wk</b>	<b>&gt;12 hr/wk</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	0	13	12	7	1	
Percent	0%	39.4%	36.4%	21.2%	3%	33 / 85

**QID 4629** - I found working on the homework problems in the first half of the course to be a valuable learning experience.

Scale text	<b>Strongly Agree</b>	<b>Agree</b>	<b>No opinion/Undecided</b>	<b>Disagree</b>	<b>Strongly disagree</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	18	14	0	1	0	
Percent	54.5%	42.4%	0%	3%	0%	33 / 35

**QID 4631** - I learned more working on the homework problems than I did working on the case studies.

Scale text	<b>Strongly agree</b>	<b>Agree</b>	<b>No Opinion/Undecided</b>	<b>Disagree</b>	<b>Strongly disagree</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	14	13	5	2	0	
Percent	41.2%	38.2%	14.7%	5.9%	0%	34 / 35

**QID 4632** - Based on things I learned this semester, I would really like to learn more about intermediary metabolism.

Scale text	<b>Strongly agree</b>	<b>Agree</b>	<b>No opinion/Undecided</b>	<b>Disagree</b>	<b>Strongly disagree</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	11	16	6	1	0	
Percent	32.4%	47.1%	17.6%	2.9%	0%	34 / 35

**QID 3583** - The assignments I turned in were graded and returned promptly.

Scale text	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Always</b>	
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b> 34 / 35
Total	0	0	0	0	34	<b>Mean:</b> 5 <b>Std. Dev:</b> 0.00
Percent	0%	0%	0%	0%	100%	<b>Median:</b> 5 <b>Mode:</b> 5

**QID 4634** - A considerable amount of the material in CHEM-643 reviewed material I had in other courses.

Scale text	<b>Strongly agree</b>	<b>Agree</b>	<b>No opinion/Undecided</b>	<b>Disagree</b>	<b>Strongly disagree</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	8	12	4	10	0	
Percent	25%	35.3%	11.8%	29.4%	0%	34 / 35

**QID 4635** - I personally learned a lot researching my term case study assignment.

Scale text	<b>Strongly agree</b>	<b>Agree</b>	<b>No opinion/Undecided</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	8	18	5	2	0	
Percent	.24.2%	54.5%	15.2%	6.1%	0%	33 / 55

**QID 4636** - I found the work load in this class to be excessive.

Scale text	<b>Strongly Agree</b>	<b>Agree</b>	<b>No opinion/Undecided</b>	<b>Disagree</b>	<b>Strongly disagree</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	2	7	11	14	0	
Percent	5.9%	20.6%	32.4%	41.2%	0%	34 / 55

**QID 4637** - My grades on the assignments reflected the skills and knowledge I have developed in this course.

Scale text	<b>Strongly agree</b>	<b>Agree</b>	<b>No opinion/Undecided</b>	<b>Disagree</b>	<b>Strongly disagree</b>	
Scale value	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>Total</b>
Total	8	9	9	8	0	
Percent	23.5%	26.5%	26.5%	23.5%	0%	34 / 35

**QID 4638** - I frequently talked about topics from this course with friends and other people not taking this course.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>
Total	1	5	6	12	10	34 / 35
Percent	2.9%	14.7%	17.6%	35.3%	29.4%	<b>Mean:</b> 3.74 <b>Std. Dev:</b> 1.14
						<b>Median:</b> 4 <b>Mode:</b> 4

**QID 4639** - I feel confident in my ability to learn what I need to know to understand issues in intermediary metabolism.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>	
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>
Total	0	0	3	17	14	34 / 55
Percent	0%	0%	8.8%	50%	41.2%	<b>Mean:</b> 4.32 <b>Std. Dev:</b> 0.64
						<b>Median:</b> 4 <b>Mode:</b> 4

**QID 4642** - Other members of my group did their fair share.

Scale text	<b>Hardly Ever</b>	<b>Occasionally</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Almost Always</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	2	3	4	6	19	<b>Mean:</b>	4.09	<b>Std. Dev:</b>	1.26
Percent	5.9%	8.8%	11.8%	17.5%	55.9%	<b>Median:</b>	5	<b>Mode:</b>	5

**QID 4644** - I would prefer if this class met in the late afternoon.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	4	12	6	6	6	<b>Mean:</b>	2.94	<b>Std. Dev:</b>	1.32
Percent	11.8%	35.3%	17.6%	17.6%	17.6%	<b>Median:</b>	3	<b>Mode:</b>	2

**QID 3599** - I found the course web-site to be a useful resource.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	0	1	0	12	21	<b>Mean:</b>	4.56	<b>Std. Dev:</b>	0.66
Percent	0%	2.9%	0%	35.3%	61.8%	<b>Median:</b>	5	<b>Mode:</b>	5

**QID 4645** - I liked the structure of the quiz with an individual response followed by group response.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	0	1	2	16	15	<b>Mean:</b>	4.32	<b>Std. Dev:</b>	0.73
Percent	0%	2.9%	5.9%	47.1%	44.1%	<b>Median:</b>	4	<b>Mode:</b>	4

**QID 4647** - I would recommend this class to other students.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	1	0	7	11	15	<b>Mean:</b>	4.15	<b>Std. Dev:</b>	0.96
Percent	2.9%	0%	20.6%	32.4%	44.1%	<b>Median:</b>	4	<b>Mode:</b>	5

**QID 13330** - I found working on case studies to be a valuable learning experience.

Scale text	<b>Hardly Ever</b>	<b>Occasionally</b>	<b>Sometimes</b>	<b>Frequently</b>	<b>Almost Always</b>				
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35		
Total	1	2	10	11	10	<b>Mean:</b>	3.79	<b>Std. Dev:</b>	1.04
Percent	0%	4.3%	30.4%	30.4%	34.8%	<b>Median:</b>	4	<b>Mode:</b>	4

**QID 13331** - Instead of case studies and group work, Dr. White should have lectured for the whole semester.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>			
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35	
Total	6	17	6	4	1	<b>Mean:</b>	2.32	<b>Std. Dev:</b> 1.01
Percent	17.6%	50%	17.6%	11.8%	2.9%	<b>Median:</b>	2	<b>Mode:</b> 2

**QID 13332** - I would prefer that the course had a PBL format for the entire course rather than interspersed with lecture.

Scale text	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither</b>	<b>Agree</b>	<b>Strongly Agree</b>			
Scale value	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total:</b>	34 / 35	
Total	4	17	9	2	2	<b>Mean:</b>	2.44	<b>Std. Dev:</b> 0.99
Percent	11.8%	50%	26.5%	5.9%	5.9%	<b>Median:</b>	2	<b>Mode:</b> 2

**CHEM-643, Intermediary Metabolism, Fall 2012**  
**Final Course Evaluation - Narrative Responses**  
**HAROLD B. WHITE – Instructor**

**Question ID: 3436 - Comment on the course.**

Responses (26 of 35)

- I really like that you don't have to study much for this course. If you put in the time for the problem sets and PBL's you really retain the information and don't have to cram the night before the exam.
- Very interesting.
- While I agree that this course definitely emphasized understanding of certain material, I thought that the material was challenging enough that without a detailed explanation from the professor about the material, I often found myself memorizing certain things instead of understanding them like we were supposed to. Furthermore, while some students in the class were able to master the material on their own, I believe that the majority were merely going through motions, would praise the teaching method because that is what we were expected to do, and then would memorize the material like I did. I believe this because this is what I saw happen when people got together and studied.
- Though by far the most difficult course I have had this semester, I find it the one of the most interesting as well. I hardly notice the time go by as I am sitting in lecture. This course is incredibly difficult, though I don't think it should be any easier.
- The course was structured to emphasize learning and understanding, not short-term memory of trivia. The ability to think in terms of metabolic process is the most valuable takeaway from this course.
- very challenging. very interesting and relevant information

- PBL courses are great at increasing understanding and forcing us to read beyond the text.
- The course is challenging but I think it helps you in future endeavors, even if they are not as biochemistry related.
- Course was challenging and effective.
- Good course.
- This course was very challenging but had me learn a lot about metabolism and dive into a deeper understanding .
- I think that the course was pretty thorough and it helped me learn biochemistry a lot better than just a lecture based course.
- The course itself was wonderful. It is among my favorite few I have taken at the university. I find the subject material fascinating. That being said, I was left frustrated and disappointed by the lack of expectations and explanation of the final project.
- Not would you think with no memorization. Overall good topics, applies knowledge to many types of organisms.
- Would have been better if there was a little more esoteric knowledge and facts presented.
- Overall I thought it was a great course. It tied in all of the things I have learned so far in my biochemical career and applied them to real life topics such as diet choice. I think this course is fantastic at polishing off our knowledge of biochemistry and bringing it full circle so that everything we've learned links together and makes sense.
- I love this class!!!
- Lehninger is not always the best for this class because it tends to show words rather than structures, however there are other books available during class if not for studying at home. Our group had a lot of attendance and participation problems, I feel like we should be experienced and invested enough not to need a group contract like in 342, but perhaps that is not the case.
- The course was interesting and full of information that was useful and applicable to everyday life.
- - it's heavily application oriented, but it's a graduate level course so it should be. it definitely makes you think like a true biochemist and not an undergraduate memorizing all the powerpoint slides. - the exams tested your ability to think beyond the simple definition, which can be frustrating but rewarding. there is no way that you can study the night before for this exam , it's continually studying and understanding of the fundamentals of biochemistry. Unlike most science professor, Dr. White's exams is entirely application(exception for the fill in the blank on the first exam) .
- Working in groups was very interesting and helped in learning more from others. The problem sets were also extremely helpful in reviewing the material and understanding that memorization is not needed, just knowing general necessary concepts will help in comprehending metabolism.
- This class it not easy by any means. It requires commitment and the ability to think clearly, which is not something all students have. This is true, however, of any graduate level course. Dr. White turns what would be drab memorization into understanding the

contexts to which we can apply our knowledge of metabolism. The course was driven by student interest in the subject and their ability to communicate with others, two attributes applicable to almost all situations. I have taken many courses that taught me chemistry, but very few have taught me that.

- The syllabus specifically states that memorization of pathways is not a goal of the course, yet the "open notes" portion of the exam period was too brief a portion of the exam period to negate the necessity of at least some of that.
- A good course on metabolism, showing the patterns and applicability.
- It's a difficult class. Which is both good and bad. I feel like I have learned more this semester than in the last two semesters of biochemistry. At the same time, I wish that he would guide students more. I know that White likes the whole PBL strategy, but sometimes it is not necessary and makes things overly difficult. Considering that I have a full schedule, I'd say I spend more time each week for this class than all the others combined. Not easy, but informative
- This class DEFINITELY contributed to my understanding of metabolism. I can now remember what glycolysis is and why it is needed even though I had taken CHEM641 previously. I do have to say, though, that group projects are not my favorite. I felt that I spent more time making sure that our project was cohesive and forming anything than learning about different bioinformatic tools, which I would have been more interested to do. Also, I think in general, the biochemistry major should include at least an introductory biochem lab, as well as an bioinformatics class, in its list of required classes to complete the major. I know both of those things would have been 100% useful during my course at UD.

**QID 4649 - In a sentence or two, describe or characterize CHEM-643 to someone who might consider taking the course.**

Responses (31 of 35)

- CHEM643 is about recognizing the patterns that occur in the metabolic pathways in our body. The extensive amount of material covered is easy to learn-but difficult to memorize. If you keep up with the work and truly care about learning the information, the class is very easy.
- A challenging but enjoyable course. Meets a little too early.
- It is a course that covers material learned in Chem 641 and 642 in less detail but in a way that is less memorization and less superficial.
- Its a challenging course, but very interesting. There is a lot of self teaching though.
- Chem643 is a class expects students to spend an enormous amount of time on their own learning very challenging material while the class time is spent describing what you learned on your own. The work level is extreme and class can be a total waste of time. Basically, your on your own.
- Intermediary Metabolism is a course designed to teach students the patterns and concepts that appear in the metabolism of small molecules.
- CHEM643 is a rewarding experience for anyone seeking to understand how small

organic molecules function in biochemical processes. As a result of the course, you will learn to recognize patterns in metabolism and make and test scientific predictions.

- intermediary metabolism was a course focused on the mechanistic biochemistry of humans, plants, and prokaryotes.
- Chem 643 is a course that teaches you to work in a number of different settings to address different problems. You learn when to trust what group members look up and tell you, when it is best to further explore a topic, and how to go in-depth to gain further understanding.
- Chem 643 is a challenging course that teaches you to develop your view of patterns in chemistry and biochemistry.
- In a blend of PBL-and-lecture-style teaching, CHEM643 develops and expands on the metabolism of various amino acids and the ways in which this information can be used and interpreted. Assignments are in-depth and not necessarily straight forward, which is an excellent way to understand the material and group assignments develop teamwork skills and playing your strengths.
- PBL, group work based class on metabolic pathways
- An in depth look at the biochemical processes in the body and how molecules are metabolized.
- This course dives deep into the understanding of the metabolic pathways, including isoenzymes and amino acids involved, to better understand what processes go on within your body. In a problem based learning setting, students will interact with one another to better develop an understanding of regulating certain steps in these metabolic reactions.
- It is a very thorough class that will really help you understand metabolism not only within yourself but within other organisms and you will understand how that all relates. It makes you see the world in a different light.
- CHEM 643 explores the topic of metabolism, emphasizing connectivity between seemingly distant pathways. The course emphasizes understanding over rote memorization (though some is unavoidable).
- A course that covers a much larger variety of material than you would think. Definitely a very difficult course but gives a real test for thinking about original problems, not just looking answers to questions that have already been answered.
- A few lectures with the emphasis on individual case studies and group work. Studying the textbook may not seem important, but will be fruitful in the long run.
- CHEM-643 combines biochemical concepts, metabolic pathways, and molecular biology into one interesting class that links all three topics together into one cohesive bundle. The class is equally divided into a lecture- base portion and a PBL-portion, where students work on case studies with their group that focus on metabolism questions applied to real life scenarios.
- A provocative yet challenging course where you expand your knowledge of multiple metabolic processes and their interaction to understand their effects on an organism as a whole.
- Probably not the best choice for a non-major.

- This course is an overview of metabolism at the chemical level. Between lectures, group work, and individual projects there are many opportunities to explore the aspects that interest you.
- You learn about life in a chemical sense and what it takes to sustain life within an organism.
- - Unlike CHEM641/642, CHEM643 is entirely application oriented. So if you think you can pass this class with sole memorization, boy you are in for a surprise...
- CHEM-643 is a course that helps you to learn from others in groups while also giving you a strong understanding of how metabolism works so that you can effectively deduce why and how different aspects of metabolism occur.
- Characteristics of CHEM342 but a little bit more lecture intensive than the previous course. Extremely time consuming so be prepared to be immersed in course work for over 9 hours a week depending on classwork conditions.
- You will work hard, learn a lot and become interested. Your ability to communicate ideas will be pressed and you will exit the class feeling more confident about it.
- Intermediary metabolism is all the stuff you didn't quite hear, or which was erased before you got a good look at it, and the things that there was no time to cover, in earlier biochemistry courses.
- It's a half PBL, half lecture course that shows patterns in metabolism so that the students can recognize them in different settings.
- The class isn't as much about metabolism as it is learning how to learn about metabolism. It's a strange class and I'm not really sure how I feel about it completely.
- It is a resource for learning about the breakdown and synthesis of small molecules, and how those processes can have powerful impacts on the macro scale, and presents information in a way so that it is understood and not solely memorized.

**Question ID: - 3610 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.**

Responses (31 of 35)

- I feel that the syllabus was very useful. The only confusing part is how the Quiz affects our grade. I really like organization and think the syllabus was perfectly organized.
- The syllabus was very clear and thorough.
- The syllabus adequately describes the course. However, it implies that the entire course is PBL like chem342, which it is not. This was misleading.
- I think everything was fine.
- The course syllabus was accurate in that it described what the course was TRYING to achieve, but was inaccurate in that you need to spend more time on the material than the syllabus suggests and that class time is more or less a waste of time.

- The syllabus accurately described the course.
- The syllabus was comprehensive and provided an excellent description of what to expect from the course.
- Yes, the syllabus covered all the bases of the course
- I think the course syllabus and timeline is clear and updated frequently.
- I think the course schedule should include the chapters that the course lecture that day is based off of.
- The syllabus was very thorough and informative. I used it frequently to stay up to date and on track with my assignments.
- the syllabus was satisfactory, there are no issues I have with it. as long as a syllabus gets the information it needs to out there that is all that matters, and it did
- The syllabus and the course matched up.
- course syllabus thoroughly explains what is expected of the students.
- The syllabus is pretty clear it never confused me.
- The syllabus does a good job of explaining the course as I experienced it. If I were to add anything, it would be a recommendation to work and study with other students outside of class (not necessarily those in your group). I find that I am more motivated and retain information for this class better when I study with classmates.
- I think the syllabus is spot on.
- The syllabus was the most useful item in this course. It provided important documents and an accurate timeframe for the semester.
- I think that the syllabus accurately described the course.
- I believe the syllabus describes the course accurately and thoroughly.
- It was fine.
- The syllabus is pretty clear, and the detailed schedule is also very helpful because Dr. White goes over the pathways so quickly in class. That way you can have it drawn or printed and just make notes on it. Although it is stated that you do not need to memorize pathways and this is mostly true, students who do not have any pathways memorized may find themselves stuck and waiting for the open notes section of the test.
- I think that the course syllabus adequately describes the course. No confusing language, and nothing is really left un- described. I wish more syllabuses that I got were this good.
- nothing misleading about the course syllabus.
- The syllabus accurately described the course and was a good indication of what needed to be done to succeed in this course. It is clear in how it outlines what is expected of each student taking this course.
- This is the most extensive syllabus I have ever seen ever. It's exceptionally thorough and easy to navigate with resources being available, and if there is an update, one can usually spot it within a day or so.
- The Syllabus is pretty accurate. The teaching philosophies and goals of the course are clearly stated. The only one disparity was that there were no pop-quizzes on the

homework like it said.

- It's a pretty good syllabus.
- In the Prereq section, BISC is misspelled. Other than that, it seems fine.
- I'm not doing that...
- I think the syllabus is very clear and well-organized. I think it might be helpful to provide a place on the course website for all the page links instead of some being on the home page, some on the schedule, etc.

**Question ID: 13333 - In groups you have worked through three extended case study problems, 1. Life without oxygen, 2. Are you what your eat?, and 3. Plants vs. Animals in the Dining Hall. Please rank these three in terms of their overall value to your learning. And state the virtues of the one you rank number one.**

Responses (31 of 35)

- This is really difficult. 1. AYWYO 2. LWO 3. PVA I would say the best PBL was "Are you what you eat". This is because this was the topic I knew the least about so I feel like I gained the most from it. Between LWO and PVA, I cannot rank them. Both I had some knowledge about and both really furthered my understanding. I think PVA was the most interesting and the interpretation of the data was easier than the other PBLs.
- I thought they were all little confusing and didn't focus on the main learning goals. I feel the main learning goals should be more clearly stated before each study problem.
- 3, 2, 1 3 was very pertinent to me personally so I found it helpful in my life and it also looked at amino acids in a way that we have not covered before.
- I would rank them 1, 2, and 3. The first one was my top ranked because I thought it was the most interesting and challenging. Learning about phase planes was helpful and I think it could be used in the future.
- 3 2 1
- 1. Are You What You Eat? 2. Life Without Oxygen 3. Plants vs. Animals I ranked "Are You What You Eat?" first because of its similarity to concepts that we had already learned. In addition, I was able to gather and understand so much information from it.
- All three case studies were great exercises in thought and learning. I'd rank them as follows: 1) Plants v. Animals 2) Life w/o oxygen 3) Are you what you eat? My choice relates to the degree in which I became personally interested in the topics covered. The best part of plants v. animals was the connection with real life; surely many people, including myself, have wondered if a vegetarian or vegan diet actually is better or worse for you.
- plant vs animals in the dining hall was the most confusing ( at this time it's slipping my mind as to what conclusions we drew from this case study). I fell like the last case study was the most valuable though, with the plant case study second, and life without oxygen third.
- 2,1,3 I think I had the greatest comprehension of the topic from "are you what you eat"

and thought it was interesting. I still need to go in depth so I personally can have a greater understanding of the topics covered in 3. I think because it came at the end of the semester, that one was pushed aside.

- I really enjoyed are you what you eat and plants vs. animals in the dining hall. I think this is because I enjoy the nutritional aspects of these two case studies. Life without oxygen was interesting, but not to my immediate interests.
- 1. Plants vs. Animals in the Dining Hall 2. Life without Oxygen 3. Are you what you eat?
- 1. Life without oxygen 2. Are you what you eat? 3. Plants vs. Animals I chose Life without Oxygen because it was the case study I had to work on the most to understand. The other assignments were a little more intuitive. I feel that the more challenging the assignment, the more you can potentially gain from it.
- I think that they all equally posed the problems specifically designed to help us learn and discuss, though I think the dining hall was the most interesting
- 1. "Life w/o oxygen"=Learned the most especially via the graphs 2. "Are you what you eat?"=Learned the second most 3. "Plants vs. animals"=Learned the least, needed more lecture on this
- 3,2,1. I found Plants vs. Animals in the dining hall most valuable because being a vegetarian it is very hard to know exactly how to obtain the proper nutrients in your diet. I learned a lot about complete amino acids by pairing certain foods and how to obtain the proper proteins in my diet.
- 1, 2, 3. I really liked life without oxygen, I didn't know ANY of that material before that.
- Highest to lowest: Life without oxygen, Are you what you eat?, Plants vs. Animals in the Dining Hall. Life without oxygen emphasizes connectivity between some familiar pathways and some new pathways. The problem forces you to examine what happens when one condition is altered or reversed.
- 2. 1. 3. Are you what you eat was a great discussion because of the broader picture it gave me of metabolism. It was interesting to look at these reactions on a molecule scale then considering them in a global context (does everything depend on the sun, technically?)
- Life without oxygen, plants vs animals, Are you what you eat 1. Really taught me about the transitions between aerobic and anaerobic and how they are regulated. 2. Applicable dietary information to my life. 3. The overall pathways of the various atoms and molecules in the world. Broader context
- 3. Plants vs. Animals (I think this was really interesting because it provided biochemical background to dietary choices, something that I have always wondered about. It is also great because it encompasses everything that we have learned in 641 and 642 and applies to a topic.) 2. Life without oxygen 3. are you what you eat?
- 1. 1 2. 3 3. 2 Life without oxygen was my favorite. Plant's vs. Animals was second because I enjoyed it but didn't feel like we covered it in full. And I didn't enjoy learning about photosynthesis so I didn't enjoy Are you What You Eat as much.
- first) plants vs animals in the dining hall second) Are you what you eat third) Life

without oxygen. I learned more from my top two because I found them more interesting and involving.

- Are you what you eat?, Life without oxygen, Plants v. Animals. The top case study really introduce things I had never heard of before. The delta 13C analysis seems like a really useful tool and it also helped me understand the different pathways of photosynthesis.
- Plants vs Animals was the one that I think really helped the most. Although, I think that I found this one the most helpful because I also found it the most interesting since vegetarianism is a common subject with people I know. 2. are you what you eat? 3. life without oxygen
- I actually think that all the three case problems contributed equally to the value of learning. the third problem discussed the common misnomer of photosynthesis while first one demonstrated lack of true understanding of glycolysis and gluconeogenesis.
- 2, 1, 3 My number one case study was "Are you what you eat?" because it was the most interesting study and made the most sense in terms of getting its point across about carbon and plants. It was also the easiest to understand once plants were reviewed.
- 1. Plants v animals 2. Are you what you eat 3. Life without oxygen Well number 1 just because some of this ideas that were talked about during our group discussions could actually be applied from a day to day basis. The other case studies were relatively interesting. I would say 2 and 3 are more at a tied level. I didn't really have a preference for one over the other.
- 1. Are you what you eat? 2. Plants vs. Animals in the Dining Hall 3. Life without Oxygen Are you what you eat was the most useful case-study because we had never learned about photosynthesis or the Calvin cycle before.
- 1. Are you what your eat? 2. Life without oxygen 3. Plants vs. Animals in the Dining Hall The first is not virtuous so much as the others vicious; I recall only a mild feeling of antipathy for Life without Oxygen, and more distinctly disliked the most recent problem.
- 2, 3, 1 2:It gave insight into how we process the food we eat. It also gave me a better understanding of why we need certain nutrients. Overall, It was informative and fun to learn about.
- 1. Are you what you eat? This made me visit photosynthesis in C3, C4 and CAM plants, and explore the similarities and differences between the three, something which I had never done before. I don't want to say that it was straight forward (nothing ever is), but it 'clicked' for me. I think I took the most from this case study. 2. Life without oxygen? maybe it was because this was the first case study presented, but I didn't really understand the conclusions from it until the review for the midterm exam. 3. PLants vs. Animals is ranked last. I do appreciate the topic, and understand the meaning,I just think the topic is too broad and that there wasn't enough specific focus for us to learn as much as we possibly could in relation to it.

**Question ID: 13334 - The final group project was intended to be a capstone biochemistry experience that integrated metabolism with other biochemistry courses you have had. Was it successful in this regard? Explain why or why not.**

Responses (32 of 35)

- It was definitely a capstone of 641 and 643, however I do not think I used knowledge from any other courses. I really hate group projects so I may be a little biased but I was not a fan of this project. I would have preferred the same project be assigned individually in early October. I did 75% of the work and I think with more time I could write a better paper than my group is going to. I get that life involves teamwork but I just really hate it.
- The final project incorporated all the skills i have acquired through the whole semester. It was interesting to see theses skills applied to an actual project.
- I do not think it was because it was very narrow in surveying everything we have seen before. I think it definitely did review what we have done but it was not so much that we could learn from the project so much as just do it because we knew how to.
- Yes. However I do not feel like we were given enough time to do the project to our best ability. I think the project should be introduced a lot sooner, so students can start to think about it and what they would like to do. The amount of work that had to be done for the project in a week was too much.
- It was successful, but seemed more like a giant obstacle than a capstone.
- I am unsure of what I gained from this project besides a stronger bond with my group members. I think we were primarily focused on answering the question and analyzing the data, and we may have missed some important connections as a result. There was a stronger connection between information that we learned in 641 because of the focus on protein structure and function and how amino acids affect those functions. The connection with 642, besides the fact that we were trying to answer a question about selection, was less clear. Then again, what I learned from 642 is that DNA is incredibly complicated.
- For our group, the final project was very much a capstone. In order to complete our investigation, we used prior biochemistry knowledge, knowledge of statistics, and techniques of scientific process that we've learned throughout our entire undergraduate study.
- I think it was. my brain is still trying to relax from all of the work/time/ thought we put into the project. I feel that my group and i worked really hard to successfully cover all the bases of the project and present our results in an organised and relevant manner and I hope we achieved that. I definitely learned a lot from completing this project; this is a great introduction for other professional manuscripts i will submit during my (proposed) career. simply, it was very challenging, i hope we rose to the occasion, i certainly learned a bunch
- It definitely provided insight but I honestly don't think my group went in depth enough on our project. Listening to other presentations, I realized that while we definitely answered the question posed, we didn't answer it up to a "Hal White" standard. If I could redo it, or even if I had done it all by myself, than there may have been other topics I would have tried to explore more. I did have a lot of difficulty finding articles

that addressed some of my questions about our topic, so further research could provide more information and would answer my questions better, but that is the nature of science.

- I thought it was difficult to get interested in the topic so it may not have been as successful for me. I did see how it was a capstone course and we did do a lot during our analysis. I wish we had been given the project a week earlier. I really would want to have more time to think outside the box with my group. More time to analyze the material and learn the bioinformatics websites would be very helpful and possibly result in a more thought through project.
- I think the idea is successful but it should maybe be done in groups of 2 vs. 4. More time was spent deciding who would contribute what to the project instead of really working together and trying to solve the question by drawing from previous biochemistry courses.
- The project was successful. Although our groups hypotheses were debunked, the process was a great learning experience and developed my skills in researching and testing methods. Because we developed our own hypotheses and ways to test, we were able to draw on other knowledge from different courses to address the problem.
- I believe so, I applied previous knowledge to the project from many other classes as did my groupmates
- It was successful as a capstone, however the other undergraduate and myself split the work and it was very frustrating in that regard. One person in my group was auditing the class so I didn't hold him as responsible, but the grad student was very disappointing in taking any initiative for this project.
- The final group project allowed me to learn about a specific amino acid pathway and compare it to other pathways within the organism.
- I think it was very helpful, and it really helped me understand amino acid synthesis, the components of amino acid synthesis, and how chemical processes in an organism all relate to each other.
- I think it could have been. It was not this for me, though. I found the expectations and statement of the problem to be very sparse. My group and I were at first confused, but after much work believed that we had produced an acceptable answer to the problem. We found out that our interpretation of the problem was significantly different than expected after submitting our work. With a better explanation of the project expectations, it would have gone much smoother.
- I didn't feel it was a good capstone to the course because it focused more on raw statistics than chemical reactions. I found I learned a lot about general distribution of amino acids but was required to look up very little info about the actual reaction of my enzyme.
- Not really. It was a little bit too narrow of a focus to be a capstone experience. More guidance, time, and making it an individual project would have helped.
- Yes, I think this class was very successful at integrating all of our previous biochemistry courses. I feel like as a whole I have a better of understanding of everything now.
- It was because it regarded the metabolic processes - specifically amino acid synthesis

pathways as we covered toward the end of class - as well as material covered in CHEM 641 and 642 regarding enzymes and genes.

- I learned a lot from the project, however my biochem background is not as extensive as other students in the class and struggled a bit.
- It was fairly successful although writing a group paper is really not ideal. Everyone's writing styles clash even when everyone in the group is competent. I was uncomfortable saying so when asked in front of my group, but I would have rather worked on this project alone.
- I think that it was somewhat successful. I found my group focusing more on math and statistical evidence to prove a point rather than trying to think things through. While this does make sense, since math is more concrete than an idea, I think the emphasis could have been shifted more towards thinking the problem through if the original question was posed more directly, or if the assignment restricted the use of statistics to one portion of the project (a short portion) so thinking and explanation was used for the rest.
- It was very difficult since the prompt seemed very vague... However, it wasn't difficult after we figured out what we are suppose to be doing. It definitely acted as a capstone to the three years we spent at Delaware as biochemist.
- This project did its best to integrate many aspects of biochemistry previously learned. It reflected on DNA and protein sequences as well as looking at an amino acid pathway and its reactions.
- Yeah, it was successful. There were some biological aspects that were considered when we were thinking about introducing our bacteria. Also, we took some statistical data that we learned in instrumental methods. There was some biochemical analysis going on too. I like group projects like this where we need to research together in order to solve a problem.
- The final group project was definitely a comprehensive study of what we have learned so far in biochemistry. I felt that it drew a lot of information from other classes as well as this one--we needed to do bioinformatics, understand principles of metabolic regulation, draw knowledge of DNA from molecular biology, and make a scientific argument.
- I feel it was much more an exercise in bioinformatics than in biochemistry; the main thrust of the assignment is to count amino acids in various proteins (and perhaps genomes), and analyze the results. While this is perhaps informed by the lessons of biochemistry, that science is distinctly underrepresented in the work relevant to the assignment.
- It certainly incorporated other biochemistry concepts, but it required a significant number of techniques that were not covered at any length in biochemistry courses.
- No, I didn't use very much information from previous courses. I did a lot of research about an essential AA that we did not focus on in class. Some basic concepts like inhibition and regulation were used, but overall it was completely new information to me.
- It would have been successful if those other biochemistry courses had been taken/were available. Noticeably lacking in the program is a bioinformatics class. To me, my

undergrad lab research experience in the Bio Department was the most helpful thing to complete the final group project. However, it did make us think about the genome and the topics involving transcription, genomic regulation, translation, etc. from CHEM642.

**QID 3611 - Open Mic. Reflect on the course and identify those aspects that you like or think could be improved. Please suggest ways for improvement.**

Responses (30 of 35)

- I think lactose metabolism was out of place. It didn't flow well with the rest of the course. Instead I would have liked to spend more time on amino acid stuff. Also, I know you do APPA but I think there should be explicit consequences for missing class. For example, after two unexcused absences you lose a percentage point from your final grade. And this continues for every subsequent absence. You are too kind to the slackers, Dr. White. And it gives people like me anxiety to have group members that slack off. Otherwise, the course was amazing and I wish I could take another course with you!!!
- It was a very difficult course which required lots of time. My only complaint is how early it met.
- I think the problem sets, lengthy as they were, were very useful. I think I learned the most from them. I felt that I did not learn much from the case studies because we never got the answers and sometimes there were no set answers or things to look up and we were limited to how well our group was at solving the problems. It would be useful to go over each problem in depth in class.
- The class was very interesting and I really enjoyed learning about the topic. Although, I did not like the amount of PBL there was. I think lecture MW and PBL on F would be better. I prefer a lecture base course.
- Dr. White needs to lecture a lot more and change his teaching style. We could learn a lot more in a shorter amount of time. He would always pose questions and expect us to answer them on our own while he tried to guide us along the way, but this should only be done one or two times throughout the year. It can be very effective and is an excellent idea, but it seems more suited to be an end-of-the-semester project, not a style of teaching. He should pose some of the same questions, allow us to speculate for a minute or two in a group, and then lecture on the answer and explain the details of the material in great length. My biggest problem, by far, with this class is how hard it is, especially when it is coupled with his teaching methods. I think there is something extremely and fundamentally wrong with a capstone class, only offered once a year, that is structured around "self-teaching" method but that in the last ten years, consistently produces midterms and finals with a high score of a B and an average score of a D or F. If the scores are consistently this low, its either time to make the exams easier or begin to curve the exam grades (why not make the highest score equal to 100 and then add that same amount of points to every exam or something like that?) Either keep this class the same and not require it to be taken by undergraduate students, or make the class easier.

- I enjoyed learning about different pathways a lot. I think I personally struggled in this course because I missed the connection between the large concepts that we learned and the details. Occasionally, I was a little lost as to what we were supposed to be getting out of a particular lecture, so perhaps making lectures clearer would be beneficial. Overall, I think this is a great course and that Dr. White is a great professor.
- I think that a few people like to complain about this course and others like it because they aren't accustomed to the admittedly unconventional structure and experiential/discovery method of learning that it uses. They probably excel in the traditional modern academic construct, which revolves around being able to memorize information and recall it in the short term. I know for a fact that the real world, including the world of scientific research, depends on skills that I learned to use in this class, and anyone who is dissatisfied by those is in for a rude awakening in the future.
- at this time i can not think of any major aspect needing improvement
- My group was definitely an interesting assortment of personalities. I feel that a group can make or break your experience with a course. I understand that put thought into how the groups are divided up, and that it is difficult to predict how a student will behave. Sometimes it was frustrating working with them, for various reasons, but I guess that is the nature of group work.
- Cannot think of anything immediately.
- I didn't like that we were assigned to groups.
- This has been one of my most enjoyable classes. Although I would have liked to have scored better on assignments, I learned a great deal and benefitted most from the mixed lecture, and PBL style.
- i think that each day should either be PBL or lecture ie maybe monday is always pbl day, wed is always lecture day and fridays either or (i personally say more PBL) but rather than lecture and pbl split because we often stopped mid though-process/ solving the problem only to come back to it a few days later and our 'flow' or 'groove' was disrupted
- Nothing beyond what has been mentioned.
- I felt like the course was repetitive of things I learned throughout my college career and didn't necessarily have a direct focus. I would have appreciated it if there was more of a guideline of what chapters to study in the textbook or what material to study in order to better prepare myself for exams.
- I think it was a pretty good course, it definitely helped me understand metabolism a lot more than I ever have. I also didn't realize that plants breathe like us at night until I took this class. And I had all the knowledge to understand that but I just never thought about it. So this course really helped me THINK in ways I hadn't and therefore allowed me to understand a lot of things in chemistry and biology that I never did. I really think more structure needs to be put into the midterm. All the old midterms have A LOT of material on them and not all of it we have covered in class. Therefore I felt like I was studying the entire book before the midterm and it was really defeating. I had no idea what was going to be on it and when I got it I felt like there was some random stuff on there that we hadn't covered in class.
- The course and material were both fascinating - they add up to one of my favorite, if

not my favorite, class that I have taken as an undergraduate. That being said, I believe the course would benefit from a few more problem sets, even if they were shorter. The expectations of the final project also need to be communicated more clearly.

Otherwise, the course was fantastic and I would recommend it to anyone with an interest in biochemistry.

- It would be nice if the exams were a little more predictable. I loved that I wasn't memorizing structures or names but I was lost on what to actually attempt to study. Even after looking at many old exams I still felt like I was completely clueless about what would be on the midterm. It was a difficult course that I felt like I learned a lot from. I had hoped to do a bit better but I know everyone in the class puts in a ton of work. Absolutely a course that challenges your usual way of taking a class, which is a great thing, in my opinion.
- More individual assignments. The quizzes don't reflect knowledge very well, but I'm not sure how to improve them. Lecture and put more emphasis on learning facts.
- I really enjoyed the class. However, I was a little disappointed with the group project at the end. I would of preferred to work in pairs or by myself.
- I genuinely really enjoyed this course, it was the class I most looked forward to every Monday, Wednesday and Friday. I definitely feel strongly that (although we don't know our grades yet) I did better in this class than I did in CHEM342. There is nothing specifically I think the course need improvement on; obviously I could say that the tests were too difficult but 1. this is a graduate level class and 2. I genuinely enjoyed the exam.
- I often times found myself confused about the case studies, and the issues I was having with them were not always resolved.
- I think it would be nice to switch groups for one of the case studies like we did in 342 to get different perspectives. It was however helpful when groups shared their most interesting learning issues or drew answers on their boards.
- Other than what I have already said about the final project, I also think that the final project could be an individual assignment (as long as more time was given to complete it). Other than that I have no complaints or ideas for improvement of the course.
- Found the problem sets to be the most helpful aspects in learning the material for this course; however, the case studies were a great way to try and learn something new from others. Homeworks sometimes took much longer to complete than the week given due to having assignments from other classes. Definitely should give more time on the midterm. It would be easier to convey that the answer is known if enough time was given to express it.
- I thought that the assignment of the first paper was too quick at the beginning of the semester, and that the group paper was too late. I do not think our "metabolic minds" so to speak were ready for the first paper--I felt that if I had gotten a better idea of what this class is about beforehand I could have done better. Having the group paper assigned just before Thanksgiving was definitely detrimental; our schedules are usually full and often times the weekends are the only time to meet. Since we lost Thanksgiving weekend, we could have used another one.
- I think the course might be better served by a longer session twice a week.

- I understand that the assignment was purposefully vaguely defined to allow students the greatest freedom, but I think it was a little too vague and students spent the first couple of days on the assignment just trying to figure out what the objective was. The checklist may have been more useful if made available earlier on.
- I just wish I had more direction when figuring out what to study. I'm about to take the final and feel like we haven't gone over much since the midterm. It's a difficult class but in the end I suppose I'd rather have White teach it than another professor.
- A lot of an individual's experience in a class set up in this fashion depends on the quality of the group. Fortunately, I had a good group and had a mostly positive experience. However, group work is not something I enjoy doing.