

# Detailed Opinions

## SENIOR CLASS 2004

*Students opinions gathered the last day of class.*

Your class has taught me many things this semester. How to be patient (which I'm not), how to manage my time (which I wasn't that good at), how to think more critically, and how to work even better with my group. You have challenged me and I'm a better person for it. I feel I can handle stress better.

A few suggestions per your request:

It was really hard to juggle all the assignments and the project at the same time. I felt like the assignments were mini projects within themselves. Maybe less assignments to concentrate more on the project, or less project requirements to focus more on the assignments.

It was also hard going into the assignments blind. Maybe if you could talk about the assignments during class and explain them and maybe even give some hints on how and where to start and a general direction. That would be a tremendous help. Sometimes I felt like I was drowning and no one could save me while I was trying to figure out what to do. It can be very frustrating with feelings of defeat like you want to give up. But, I made it through with no visible scars, and in hindsight, I'm glad you challenged me.

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First off - I think there should be a GAMS tutorial, maybe optional. I spent far too much time learning GAMS, than many times that more helping others learn GAMS for their project/assignment. Yes, it turns out it's an easy program, but we're not used to programming and it took a long time to learn the basic syntax.

Next year, the projects should be more technical. The only group I saw that really had worked through theory was the moon group. Other groups were rooted in marketing, economics, plant location, or FDA approval. I agree these may be important features, but it's hard to debate economics in the presentation. Plus, I spent the entire semester working and feel like I did little actual chemical engineering. I could have gotten through the project with little background in ChE.

I don't know what to say about the cheating situation, if it's even resolved yet. Cheating isn't rampant but everyone talks in there. It's too small, too cramped, and you're in there for too long, getting too frustrated. I've seen literally everyone help someone else. All I can think of is have more individual, different assignments.

I personally did not gain much from the assigned readings, but I don't think they should be disregarded completely. Just incorporated more. And have some TAs get more involved, hands-on. Other than that, it's painful but necessary overall.

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Here are my suggestions for future classes:

- Make projects more equal in terms of difficulty
- Projects would be better if assignments were less demanding
- Keep it challenging and hard, but not more so. There is no possible way some of us could have possibly produced any more work.

I worked harder this semester in just this class, than other semesters when I was taking 18 hours of hard classes. I was disappointed in my performance at the presentation as I feel that I could have done better. However, alot of it had to do with me not getting any sleep for over 36 hours at that point, and I was having a hard time thinking. I was proud though of the way our group finished. I feel that it was a difficult project, with a lot of work. I was proud of my group and the hard work they put in the last few days and weeks. They really saved what could have been an embarrassment.

I'll never forget this class, for many reasons, and I came away with a few friendships that I otherwise wouldn't have made.

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You said you wanted concrete suggestions for the future. As far as what I did learn, I can't answer that, but I know I learned more in the capstone class than I have in any other class. Many suggestions I have would be for minimizing whining from the class, but I am sure you have already thought about that. Please do not take any of the workload out of the class though. Up to this point, most students have not been challenged the same way they will be in real life situations. I think the most frustrated students fail to realize that (thus leading them to whine a lot). However, I think one very fair thing that could be done to help the students is to make the capstone a 5-hour course, therefore allowing students to meet their 12 hour semester requirements easier and without having to take additional courses. Also, some material could be delegated down to design 1, allowing for more time to be spent on the capstone.

We spoke once about having assignments due one week, and the next week having project meetings (so basically not having them in the same week like we did this semester). This would maximize the amount of work each student put into both things, rather than them knowing they have two weeks until the next thing is due. It would minimize procrastination and, consequently, the feeling of an overwhelming workload like many students felt this year.

Early in the semester, we had to write about environmental issues. One of the class days we missed, we should have used to discuss these issues or just had an informative lecture on what and how companies do to meet laws as well as the laws themselves.

One idea for an assignment would be an open-ended problem where the student has to size/optimize a catalytic tubular reactor given a feed stream. The work I did on steam reformation/WGS brought my understanding of engineering concepts to a new level, from reading about it in the E-library to implementing case studies on it.

Thanks Dr. B. This semester I learned a lot about myself and what I am capable of.

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Hmm, don't really know what to suggest. I'm sure you've heard it before but the assignments are an issue. The grading on them seems highly biased. Otherwise, the class is practically perfect. I like the way you have it set up. No serious complaints. Your perception of who are hard workers may be skewed though, ....

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I definitely liked the emphasis that the class placed on the project. Homeworks were good too, but i felt that there was too much redundancy in the assignments themselves, which was frustrating when we had so much else to do with respect for the project. I think that each assignment could be cut in half without losing much of the practical application of theory. in addition, I think some explanation of how to utilize resources -periodicals, libraries, online journals- should be part of the CH E curriculum. This, ideally should be part of the earlier curriculum-say sophomore year with fundamentals. A review would be nice, however. The project is the first time for many students when they have to read academic journals.

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Well all of this is almost over, and it has been one hell of an experience. I knew coming into this that the semester was going to be tough and you would require a lot of work out of us. I prepared myself for the worst and somehow it got even worst. How do you think of these long homework assignments. I guess you have the right part cause thinking of the questions doesn't take even as near the time to complete the thing. Though the homework was very time consuming it did help me out alot. I had no idea about heat integration, and now I would consider myself proficient in heat exchanging design.

The only thing about the class that got me was how many times you would change your mind. It seemed like you would tell us to do one thing and we would do it and then you would be like why the hell did you do that. It was amusing at time though frustrating, but I know that's the beauty of research.

I think you should give better insight to your test other than just separations or thermo. That is very general with way too much to study. Don't necessarily have to give a review but some sort of outline to what might be on the test.

Other than that I think you did a great job. I don't think anyone else could have done a better job, or for that matter I don 't know if i would of wanted anyone else doing the job. You are very good at what you do, you can see the compassion of the want for your students to learn. I enjoyed having you as a teacher, you have a special gift of getting results from your students even in the most unreasonable circumstances.

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I would like for the biotech projects to be something different but the same. Many a times, no one in the biotech option gets a chance to experience it, and if they're like

myself will want a process type project. My suggestion is to provide something like a cross project. Like this year there was the monoclonal antibodies project and ours. It would have been interesting to have both groups and that way we could talk about selling and modification of the products for another company for use in their product. Something like that, especially since a lot of the companies use SuperPro, and we have little experience in it. Also, just because they are biotech, doesn't mean all the biotech projects appeal to them.....we are chem e all the way, and doing the senior project may be the last time some one actually does classical chemical engineering.

This semester has been at times, tumultuous, great, sad, long, short, tedious, cumbersome, enthusiastic, energetic, horrible, time consuming, detailed, vague, fearful, relieved, anxious, stressed, and most of all pretty beneficial. I think everything went well, despite my incident, and I do believe I'm starting to think you're an okay person.....I better get my head checked before the rest of the class finds out, they all hate you, hence the Orifice Award. All jokes aside, it was good and educational---when xxxx and yyyy told me how much work they had to put in and how they still thought you were the best teacher they had, it was hard to believe until now. Oh well, it's over.

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A lot of these suggestions will probably seem funny, but next year:

- push the groups harder earlier, specifically the ones that are redoing projects so they can get to the new work. I know you said this a lot, but obviously our group still ran out of time.
- make every presentation formal. It just didn't hit home with me how time to improve what we were doing was slipping away and, although there's probably nothing to do to help people like me, this might have had an impact. Essentially, make the impending doom (of failure or penalties for non-excellence) more apparent
- post all the assignments at least two weeks early, if not at the beginning of the semester. I suppose you were incorporating a time-management/working under pressure strategy, but I would have appreciated knowing what I was up against a little earlier. Not everyone will appreciate or take advantage of it, but it may be useful for some.
- allow more assistance for assignments... involving GAMS and modelling. I know three people that were upset because Javier won the TA award because he always seemed to be too busy. I got help from him at the very end of the semester, but it would be easier if he had help.
- the last quiz took me by surprise, as you know. I just didn't see that one coming at all. it's probably my fault.

It seems like all of my comments could stem from my lack of attention. I don't suppose there's anything to be done with that as far as class policy is concerned.

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Well, it is almost done. I can't believe I have almost made it. There have been far too many sleepless nights, frustrated nights, and right down miserable nights, but yet it is almost over. I have enjoyed many aspects of the class. I enjoyed the challenges. I am proud of myself and proud that I have gone through the experience (torture, whatever it is called). As far as suggestions for the future:

1. I don't think many things can be changed for the future. The workload must remain the same until the curriculum is reformatted such that students are exposed to many of the challenges they see in this class. In order to do that professors of earlier classes must be willing to give a little of the theory up in order to better prepare the students for the real life situations (such as modeling).

2. I think you should be much harder on students in the beginning, letting them know exactly what they should expect. I think you have gone through phases this semester where you were a little laid back in the beginning, very tough in the middle, and again somewhat laid back in the end. Hit them hard in the beginning so that they will perform better early on, which trust me, saves you a significant amount of headaches later on.

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I had very high hopes and expectations in this class. I heard a lot of positive things from past seniors...so I was so excited about the challenges....I loved my project...I was on top of the world....AND THEN. I lost it. I think the structure of the class is fine: no major complaints about the work load or projects. I HATED the constant feeling that I had of "am I doing enough," "is he satisfied with my work," You said that you want your students to "impress you"...OK well...Could that be defined just a TAD :). Many students complained that they could never deliver what you want anyway so why even try...It got to the point to where many students just completely ignored your advise because you probably would still feel like the revised work would be "crap". I don't have a problem with your style: the "high expectations", the "straight-forwardness", I actually appreciate it (you've never hurt my feelings or anything like that)...I think its great to get to the point of things and push students to deliver their best. Positive Feedback, when applicable, would be nice!!! I think this would provide an environment that is less tense and allow students to be motivated to do more.

I enjoyed the class...And you as a professor...THANKS!!! FOR EVERYTHING  
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I feel that this class almost destroyed my interest/desire to succeed. My analogy for this class is that it feels like climbing up a sand hill because you know that no matter how fast and hard you climb there will always be more sand thrown in front of you to prevent you from reaching the top. While there is something to be said about the continual effort that these exercises require, knowing that you are working towards a fruitless goal is very damaging to a persons' psyche. This being said I really truthfully and honestly like working hard. This is something that was taught to me at a very young age and has stuck with me my whole life.

I do not think that I am great. Very few people have made mention of this to me before in any context, but any person that does not have a strong self-confidence and high personal opinion I believe is destined for failure. In example in sports it is well known that as soon as you think you MIGHT lose you have already lost. If you walked onto the judo match against an opponent thinking you MIGHT lose, no matter how good they are, you have likely already lost. I think this may be why you take me as a cocky or arrogant person. I will never admit that I am defeated until the game or contest is over and I will always approach things thinking that I will succeed. I wish you wouldn't have gotten this false opinion of me (it is false in my opinion) because I believe that losing successful people (such as you) as personal references that have played a major role in my academic career is a terrible thing. I wish that this would not have happened. (You are the greatest.)

One area that I could see being an improvement in this class is letting people that they have a chance to complete a successful project before the very end of the class. While there are many ways to motivate people to work hard I have never believed in the "Break people down to build them up" theory of things. I prefer positive motivation that encourages people to further their success.

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I can't believe it's over (well almost over). This class was definitely the hardest I have ever taken. I never thought I could spend so much time working for 3 hours worth of credit.

The biggest thing that I got out of this class was time management. Luckily, I never fell too far behind with the coursework, however, I saw many people who did not manage their time as well. It seemed like the people who fell behind never really caught up with the rest of the class. I witnessed this firsthand with Justice. Justice really is a good guy but he slipped up early in the semester and it affected him (and our group) significantly. He did start working a lot better towards the end of the semester and he ended up being an important member of our group.

As for the class structure, it might have just been me but I worked so hard on the assignments that at times the project seemed like an afterthought. Coming into the semester, I thought that the project would be by far the most important part of the class; however, my hardest/longest nights were probably spent working on the assignments. Some parts of the assignments seemed to be busy work.

I am glad you taught us some "new-age" engineering. I feel like it will give us an advantage because we may see things a little differently than others that we will be working with at our jobs.

All in all, I am proud to say that I made it through your class. I guarantee you that students in other majors don't have as much of a feeling of accomplishment after their capstone classes.

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I am glad this class is mostly over. As far as suggestions go, I would suggest that you either remove the homework assignments or if you must have them in the curriculum, make them relevant to the projects that

you will be giving out. Also, as far as the projects go, I think you should have projects that will require an equal amount of work. I would also like to suggest that you split people into groups evenly so that the work load is distributed evenly amongst classmates.

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For future class, i have couple suggestions. I think a more in-depth review should be given before everything quizzes because most of us forget materials learned in previous semesters. Also, a lecture should be over crystal ball, @risk and GAMS.

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I wasn't aware that it was spring outside until today. It feels good to finally be done with the project (for the most part) and be able to spend some time outside of the lab. I don't really have any major suggestions about the class. One thing I would have liked is if the assignments with the risk analysis were earlier in the semester. By the time we got to them I didn't have enough time to devote to them. That being said, I'm going to take the rest of the day off and go drink some more beer, while my roommates that are Economics majors whine about all the work that they have to do. Talk to you later.

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I am surprise but semester is almost over, one more week. Maybe I told you one too many times that ' I hate my reactor', but I really enjoy class it was good life experience. Only one thing I think three people groups are little too small, because if one of your group mates decide to do only one part and don't care about rest of the project it can become a problem. I have only good things to say about your class so keep up your good work and make students work hard. Also stay cool

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This has been my most challenging semester but probably the one where I've learned the most. What I liked most about the class was that the project was very large and challenging, almost like doing research. I'll be going to grad school after next year and I feel like this class has shown me how to better research, present and work in groups. It has especially shown me to pay attention to detail, something that unfortunately gets overlooked far too often in industry and that I think has rubbed off on me.

As for suggestions for next year, keep it similar. The assignments, quizzes and the project are more than enough to keep students occupied. But there should be more teaching in the classes, especially on GAMS and modeling. Some people are only in 6 hours while others are 12+. Its harder for the 12+ to keep up. There should only be 5 assignments next year, 6 is too much. And make the assignments equal weight, students will always work harder on the first ones regardless if the last 2 assignments are worth the most.

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Point 1: I think that more review sessions for quizzes that are given in class should be done or even just 10 to 15 minutes of a review in each class prior to the week that the quiz is given (if done this way, then you wouldn't have to worry about finding another time to meet in the evening or on the weekend). I know that when you don't use something, it goes away, and I know that I personally suffered in this area because I hadn't used a lot of these concepts in a while. Sure, a week was given to go over these concepts, but a 10 to 15 minute review would have been great. Just a suggestion and

since we tended to get out early during a lot of Tuesday class periods, this could probably be included. I don't think a student would complain and if so, don't make it mandatory.

Point 2: The project. My project was good and I have a better opinion of the topic now than when I started. I think that an e-mail prior to the first semester ending to each student that will be in your upcoming class explaining the projects would be good. In this, you could take suggestions or simply tell that they could approach you if they had ideas for something that they personally would like to try. I say this because xxxx did this and won the award for the best project. It facilitates creativity and I think enhances the Chemical Engineering program at the University of Oklahoma. I think that if I would have thought of something that I could do as a project, I might have been more "into" and how did you say it, "hot" about the topic that I had.

Point 3: Maybe introduce risk earlier in the semester. I liked this, but didn't have a lot of time for it to sink in because the semester got busy and this topic seemed to be something that could have been useful at the beginning or even middle of the semester. This is important and I liked the unit on risk. That is just a thought and I can only suggest this not knowing how you have the class set-up, so take this one as a light comment, because I acknowledge that you probably have a good idea of where it fits. I just am suggesting how it might help.

Finally, don't give the option for a C from the get-go. Make them work. They get to the end of the semester and want to "just get out," but what is that saying about the quality of this education. I know that when I interviewed and recieved an offer for my upcoming employment, my employer was impressed with the curriculum, and especially CHE Design Curriculum, at the University of Oklahoma. If they got this far, they should all have to work at it. I did, and I have put in a lot of sleepless hours to this class. I know that it is hard, but I am still walking and still alive, and if I can do it at age 25, any of the upcoming students can do it.

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1.) You've said that learning time management is one of the objectives of this class. To properly evaluate time management, a student needs to know the value of each assignment and homework so the he/she can prioritize tasks. I think that you may want to consider posting more clearly and outright the extent of how each assignment may affect one's grades.

2.) Seriously, work invested versus lessons learned in regards to Assignments needs to be reconsidered. The heat integration assignment was in my opinion the only assignment where the lessons learned was worth the work. I think the others need some serious editing to make them less labor intensive.

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I honestly, truly can't think of any suggestions for the class. I am not just saying this to suck up, but I really I don't think I would

change a thing because every time I think if something was different, or if things had gone differently, I might not have learned something, or missed out on something. I honestly truly learned the most in this class than any other class, so I really wouldn't want anything changed. There is one little thing though, that wouldn't take away from anything, and that is just to hold people accountable more. I'll admit that I am not one of those really super duper hard workers that is just so passionate about school and engineering, (and we have a couple) but I do do my work and try to do it well to the best of my ability, and I EARNED my degree. I guess I feel that maybe the earning part has gotten a little relaxed (maybe obvious by the cheating cases) and a lot of people have the attitude of "Oh, he won't fail me, I'll pass" or whatever. I guess I just hate the fact that my degree, which I worked extremely hard for, is worth as much as Joe Blow's who didn't really do crap and copied all of his assignments and didn't do anything for his project. I am not just talking about this class, I guess I am kind of talking about through the curriculum. But I'll stop talking about it now, because I think I am starting to make it sound worse than it is. I think we have a class FULL of really hard workers who keep impressing me everyday. I guess it is just a handful of cases which bring down the rest.

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My suggestions for next year are few. I think things should be just as hard for the juniors as it was for us!!! I think all the work was hard and I think they should have to do all that we had to do. I guess my only real suggestion would be that I wish you could lecture a bit more on homework material so that we would have more of an idea on what to do. Also, I think the class should be tuesday and thursday (not just on tuesday). Oh yeah, I think you should also lecture about gams and show the class how to use it. that's it.

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How could this class be improved? My group contributed tons of time and tons of effort for little returns. I feel like I have made great personal accomplishments because of what we had to begin with and how we have improved in programming, but our analysis of results was not nearly as thorough as it could have been.

If there were more TA's or if you did a class survey at the beginning to build this group with someone that was very proficient at programming we could have found out months ago that the model was incorrect. We could have done MUCH more engineering and working with our results and less programming. We had to work hard to make GAMS programming into strong skill. I know I learned a lot of programming in this class, but I wish that this barrier could have been lowered with someone leading us in the right direction months ago. I think this could be one advantage of combining disciplines for the capstone project.

You told us that you thought that the group's mode from last year worked when you decided to make us a group of only 3 people. When we determined that the model was not as good as we thought it was it would have helped if our group objective was lowered or if more people were added to our project.

If my group members and I were in the moon group or in a group with people that were better at programming much more of our work could have

gone into results. I feel that it is unfortunate that I was in a group where my hard work could have been manifested itself better with tasks that were more suited to skills that I already had. That I could build more results on while solidifying existing skills while making results instead of having to learn a new skill to get any results at all.

Nonetheless, I have learned a lot this semester. I think that the most important thing that I have learned in this class is you should not blindly trust people's work and people's results no matter who they are. Engineering is to being able to make your own conclusions.

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My main suggestion for next year's class is to really pick one thing to focus on. While I think that the project, the homework, and the quizzes were beneficial in many aspects, I found that the work load with these three things was just too much. I would either lower the amount of quizzes or homeworks and focus in more on the projects because I think that they were the most beneficial in my learning. The projects, though open ended in many cases, incorporated many things from past years and I believe that they will help me most in the work force.

Personally, I thought that the risk lecture was very helpful not only in homework assignments, but also in the project. I would incorporate more discussions like this so that they could be incorporated in the project.

I think the biweekly meetings were good in keeping groups on task. Had our group not had these, I believe we would have been very far behind. I also think that giving a biweekly report of what we had been doing was a good idea to make sure that the tasks were as evenly dispersed as possible.

The only other thing I might suggest is a refresher course at the beginning on using PRO II. Although I have used it in other classes, I don't feel as if I was very prepared for the assignments using PRO II. I had to learn as I went which seemed to take me longer than necessary. I would also include a lecture on how to use GAMS, rather than just giving us a template.

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To all future chemicals engineers at OU,

Going into Dr. B's class, all I hear from past chemical engineers from OU is how demanding this class is and how much it involves. And after finally finishing it, I can honestly say that everything I heard before was true. Before this class, I couldn't imagine possibly how much harder this class can be compared to that of all prior chemical engineering classes. This class is not that much harder, but it incorporates all classes into one. Some of the test for this course reviewing past subjects are tougher than some of the test for some of these classes. This is because the test are so broad and studying for everything dealing with the subject is nearly impossible. Therefore, giving students a better idea of what will be covered in the test is a good idea for future reference. Also, the review for students

who needed to retake the exam was very beneficial. The way you present the material was clear and to the point, with a more realistic approach.

Another thing that I liked about the class is learning about new innovative ways of thinking. For example, the way the industry is transforming to a irreducible to a reducible approach to engineering. This method really changed my logical approach toward situations. The way I thought before, I tend to solve one problem before going to the next. This leads to errors because the problems may be associated towards one another and by doing this, the best solution may not have been chosen. With this approach, you may have to look at more possible scenarios, but a better answer will be generated.

One of the software used to generate this is GAMS. The different software programs used in this class were all useful and aided in the development of our engineering minds. But some of these software were difficult to figure, and without any background, might take a lot of time to master. Therefore some sort of introduction would be nice. For example, I had no programming background and GAMS required some knowledge of programming language. Maybe this needs to be entered in the curriculum or covered in this class.

Overall, the class was really beneficial. Yes it took a lot of time and other classes will suffer because of this class. Even though this may hurt you in many other ways, it is good for you because what you learn in this class is more important than any other class are and have taken. It teaches you to organize yourself, time and workload.

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Well, it's almost over and I'm glad. I think it would be a good idea to cut down a little on the assignments. I'm not saying make them easy, just try to avoid repeat problems. The heat integration and risk/uncertainty assignments were really helpful. We really didn't know anything about either subject, but now we all have a pretty good grasp. Some lectures on gams would probably be helpful. We need to have more accountability with teachers for our projects. They need to be willing to look over the projects that are their ideas. I think that this would save some of the groups from making some technical errors. I wish I had put more into my project than I did. I feel like we worked all semester, then missed some technical issues because we didn't have enough knowledge and just assumed something would work. It seemed right at the time. I didn't even about it not working. It will all be taken care of for the final report, so I guess it still turned out okay. It 's just kind of upsetting to work so hard for a presentation, give a good presentation, and then it's all forgotten because you have technical errors that make you look like you didn't look at anything. Thanks for all the pushing. Now that it's over I guess I'm glad that I went through it. I did learn a lot. Thanks for everything, I really do appreciate it. However, you could be a little nicer to the kids next semester. They might not be as tough as our class.

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-GAMS, CrystalBall, and @Risk tutorials, possibly before you get into Advanced Design -More computers in the computer lab -Make buying the book optional; it is not all that helpful and most of the material is available from books we already own (like Separations, Thermo, etc.) -

Make the order and list of quizzes available early in the semester so that people can have more time to study.

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Give students the same chance to make up points on the homework that you gave to students who were struggling on the quizzes. Redo is worth up to the class average or something like that.

Speaking of homework, I like the way assignment six is formatted. It seems much more reasonable as a homework assignment. Assignments like that would be sufficient to teach the students, but still leave them free to work on their assignments.

(Note from instructor: Assignment 6 was a small open ended problem).

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Assignments:

-Don't push assignment due dates into finals week!!!! This is regardless of the pain and suffering students may go through. I would rather work harder throughout the semester than to have to do more work after the project submission.

-Put a two week "empty space" for assignments where moving and shifting can happen in case students are hard-pressed.

-I would reduce the number of assignments by one, even if this means each assignment requires more. And, pretend the last assignment exists, and when students ask you to cancel it, it's not a problem.

-Allow students to choose the programming language they want to use when doing a program. And, if you insist on GAMS, definitely review it in class and provide a command list or something like that.

Projects:

-I heard 3 people groups are no good.

-Give a 10% boost (or some sort of grade boost) to groups that present their project at some competition.

Tests:

-Maybe have a list of topics we are expected to know about for each subject tested on at the beginning of the semester. This way we can know way ahead of time.

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I wanted to say that I know people have their opinions about how the class is run, and I know many were unhappy in this class about how things were done. But, in comparison to people from last year who looked back after it was all done and could say, "wow, I made it through - I survived and I succeeded in something that seemed nearly impossible at times," I concur with that class. I know, as the other students know, about some discussion that has been going on to change how this class is run. I can say that there were times when I was extremely tired and hard to face even more work, and it was frustrating. But now that it is done and I accomplished what was asked of me (hopefully with some success), I look back and am thankful that I had to face the challenges I did and survived. It means more to me to go through what seemed like hell sometimes, when it seemed like there was no light at the end of the tunnel, and to find the light and

finish. It was no walk in the park, but I would have been disappointed next year if this class had been easy as cake, ...  
The only suggestions I would have for changing the class would be to somehow put the homeworks that cover the "new" material earlier in the semester. I would have liked to know more about risk analysis since our project really did not involve much, and I feel rushing through that homework and not having time for the last assignment didn't let me get a great understanding that I would have liked.

That's about it - I think you are an outstanding professor and putting the students through one last tough semester should only make their degree mean that much more to them when they finish. Thank you for all of your hard work. It is clear that you put just as much (if not more) time into these projects and the students this semester, and it is encouraging that you are willing to put in the same amount of hours as we do. I also appreciate the party that you threw for us, and how you make an effort to bond with the students outside fo class. That is admirable and appreciated by us, as most professors do not take the time to hang out with the students outside of school. In closing, thanks again for a great semester, and I think classes in the past may have appreciated the challenges more than this one, but I definitely think the difficulty of the course should not change in the next years. I'll keep in touch next year and let you know if I made it through.

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I know it's hard for you to put the groups together. I'm sure that you have some sort of system in mind that, to this day, I still do not understand. I have realized over the course of this semester that your group is everything. It is possible to make a mediocre group work out, but it is hard to work with an impossible group. In the past, other students in our class have complained about having to work with both of my group members for various reasons. So, I remember back on the night, when I got a phone call from Mr. xxxxx , telling me my group members. I had a few drinks that night, let me tell you. I knew from that moment on that I could be in trouble this semester. I tried my hardest to make the best of the situation, but it was very hard for me. Sometimes, I have trouble with confrontation and motivating people who refuse to be motivated. So let me get to the point. I think by the time we are seniors, we know who we could or could not work with. So, when I requested the same project as people who I can work with, I was disappointed to find out that my request had not been granted. I just think that students should have more input in their projects and the people they work with. It is not fair for someone who really cares to be randomly put in a group with those who do not. I feel that my performance in this class is directly related to my chosen group.

When I look back on this semester, I just can't believe this is me. It is truly uncharacteristic. I have never been worried that I wouldn't pass a class before. I've never had an awful group before. I guess I've been lucky until now. But if you asked me in January if I would be in this position that I am in now, I would have told you that it was impossible. I just can't believe that this is happening to me.

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Overall, I learned so much that I would not change anything. All that matters now is finishing the semester off as well as I can. It was a challenging class, but I feel like a better qualified engineer, now.

My comments for next year's class:

I am very glad our capstone made us review, and required that we utilize the skills we have learned for the past four years. Even though my performance in other classes suffered because of the heavy work load, I am very glad that my last semester taught me as much as it did. The one thing I would suggest is to review for all quizzes. I really liked the thermo review and think that reviewing the other subjects would be very beneficial, also.

Thank you for everything, and for all of the time and help you have given us. I've learned so much!

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It was good, we do a great deal of simulations though in comparison to everything else...I'm wondering if this is normal, or it has something to do with the fact that it's your area of research (it's not a bad thing, just an observation).

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1) Post the final weight of each quiz at the beginning of the semester. This would allow students to know which quizzes are going to have the greatest impact on their overall grade. I think this would be fair considering the great deviations between the weight of different quizzes.

2) At the beginning of the semester, determine a weighted percentage of each category for the calculation of the final grade. This way students will know what to concentrate on during crunch time, i.e. is it more important to work on the assignment or the project.

I believe these changes will have a positive impact and increase the clarity of the expectations of the students.

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This is, hopefully, the last journal that I'll be writing you. I'm still not sure how I feel about this semester. On one hand, I don't think any work I do in the future can be much (any?) worse than what we've been through here. On the other hand, I feel like my classmates and myself have survived an ordeal and are stronger for it. Of the many complaints I have of the class, I would have to say that the lack of consideration for other activities is the biggest. An exceedingly large amount of time and work is required of this class, as well it should be, but this severely cuts in to the time that is available for things such as work and other classes. It cannot be assumed that no student in this class works. I have been struggling to simply pay bills all semester because of the number of hours that I have been restricted to working. Further, through I must say that I have learned an incredible amount about chemical engineering design and improved my ability to work alone and in a group, this is not, nor should it be, the only class or venue in which I should be learning. I will only cite for example Dr. Lobban's class. I have spent considerably less time than I should have studying controls material because this class is of prime importance this semester. Besides that, I don't have much to complain about. Again, this has been an ordeal that I feel all the

better for having survived. I am not sure that I now want, nor have I ever really wanted, to be a chemical engineer, but I thrive on challenges so long as I am free to determine my own method of solving them (\*cough\* experimental results \*cough\*). You have certainly provided me with a number of challenges both academic and social (I'm not sure that I have ever argued with a more obstinate person than yourself). For this I am glad.

I think that I really only have two suggestions for next year. First, focus less on homework and more on the projects. Everything that we have done in our homework could potentially be worked in to every project. I think that more can be learned from the material if the student sees why exactly the problem is necessary. The homework scenarios are fine but application of the material to a process that the student is completely engrossed in all semester would be far more beneficial. Second, more constructive criticism should be given. It seemed to me that only negative criticism was offered on project material near the beginning of the semester and was not necessarily replaced with positive feedback as everything progressed. Whether this is done simply to break the students or because our work really was as terrible as many people began to feel it was (i suspect it is some combination of both), I wholeheartedly feel that you should offer more comments on what is specifically good about the work. It seems to me that only problems with our work was focused on all semester. Simply, I want to know if ANYTHING that I have been doing is right. As more and more errors were identified without any hint of successes, my confidence in the work continued to decline sharply until all of the energy that could have been put in to improving the project was instead wasted on displeasure (put VERY lightly) with you and your "suggestions". Hearing once that "this is good, now move on to this" might have improved my entire semester or at least my outlook on this class. All in all I know that I will look back on this class as a good experience (now I'm going to take it easy for a while and sign up for boot camp), but, as with everything in life, it surely could have been improved upon.

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Well, so it ends. This semester has been interesting, and tough. Looking back, I learned a lot more than I thought I did. I really liked the heat integration topic. I think you ought to spend more time on that. I also think the risk and financial analysis sections of the class are excellent topics. I think for next year, you need to have some kind of assignment using SuperPro. I think it's a pretty powerful tool that has a bit wider application than Pro/II. I didn't love the assignments...but you do learn a lot trying to do them. It's a lot of work...but it's worth it. The sense of accomplishment wouldn't be there otherwise. I guess my main suggestion is....keep doing what you do. Thanks for everything.

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I really can't think of anything to change. Except more time for the assignments; maybe five assignments. I benefited from the quizzes and found that it was a nice refresher for past material. I have enjoyed working on the project if though it about killed me and my family because of the time consumption. I have learned a lot.

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I think the best part of the class was the work on the projects. The ability to organize and carry out a long term project is a skill that

all engineers need to know. This is the first class in which we had a project that lasted the entire semester. Since this is our first time with such a project, it would have been nice to have a little more guidance as to what is expected. I am not suggesting that you give students in the future more guidance as to technical information but rather the general structure of how a long term project should be organized.

I like the idea of being give a long term, mid term and short term goals (project, homework and quizzes). This is a good structure, but it is in need of modification. First, the grading system. I don't like the idea of being graded solely based on my lowest performance. Second, the homework assignments were far too long (I know you get tired of hearing this, but it is true).

Those were really my major complaints with the course. Since I am not going into engineering, I can not comment too much on the usefulness of the material that I learned. Improved time management skills are what I will take away from the course, which is something everyone can stand to do better.

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I only have a few suggestions. An additional lecture on heat integration would have been helpful. Especially if you are planning to assign something using the MILP method. I know that part of the point was to make us figure it out on our own, but it felt like I spent a lot of time, especially on assignment 5 trying to figure out just how to use the software and understand MILP that I was not using my time well. Also, a refresher on programming language would have been incredibly helpful. Most if not all of us have not had any programming in 3 or 4 years if not longer. Then when we are forced to use GAMS, there is a readjustment period. Again, I know that an important part of this class is to push us and to force us to manage our time, but not having an assignment due the Friday before spring break, the same day that mid-term projects are due would have been nice. I feel like our project would have been much better at that point in the semester if that week could have been used to focus on the project.

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1. Lecture more. I think that there is a lot of material in the assignments that isn't covered in class but that should be. There is also some stuff that should be explained in more detail, like the risk and stochastic modeling.
2. Have tutorials on the software. I think that we might have had one on PRO/II, but it would be nice to also have some on GAMS, Crystal Ball, and @Risk.
3. Shorten the assignments. They are too long and intense.

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Hopefully here is the last time we will talk. It is been undoubtedly a hard class. However, it is been fun working on the project. I think you agree too that this is quite difficult class compare to any classes I have ever taken. But I have learned many things from this class that hopefully I will get to use for rest of my career. First I did not like that quizzes and tests for this class but I think it is important to

freshen up your mind because let us face it we have forgotten most of the materials after a long time. I think it was difficult to go back and review all those things but I think it was interesting at the end. Overall the class was excellent. I would not want to come again and do this. However I loved it. Look at this I am still here at the last day of the semester and talking to you. It never ends does it? I am just hoping that everything will work out pretty nicely at the end.

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From all the experience that I have had in this class, I think that the assignments and the quizzes were very helpful, at least for me. The project makes us become more creative and also more active. For me, I have learned several things in real life situation that I had never thought of, which is good to me. But I have some suggestions:

- Number of people in all the group should be equal or closed. The reason, I thought, is because people in small groups have to work very hard in order to compete with larger group, but some people in large group may rely too heavily in other members. By both of these, there exists some kind of unfair to hard-working people. That's my thought.
- Computers are problem. It would be better if there are more computers installed with the softwares that are needed for class assignments and projects no matter where they are in school.

Besides these two things, I felt comfortable with everything else.

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Let us pick our own groups. By this time, we have been assigned random group members throughout the curriculum. I understand that you are trying to teach us to work well with others, but we have gone through so much already with that random assigning that I believe we should finally be allowed to pick our groups.

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The only thing i would suggest about future classes is that you keep the same required text for the class because it was very easy to read and very helpful when doing the heat integration assignments. in my opinion, this was the easiest book to read among all chem e classes i've taken.

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I think quizzes are not as helpful as people should have already learned the things which were reviewed. I think if they forgot them the first time, then the same results are likely the second time around. Assignments would be better if they were all given before spring break. Also gams should be covered very early on. It was frustrating not to be able to present because the model did not work and it was a task that was basically assigned to one person. Realistically only one person needs to work on a model, but maybe if all of us could have concentrated on it after spring break it would have got done much earlier.

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