



University of Connecticut

Student Evaluation of Teaching Spring 2014

Individual Report for MATH-2110Q-005-STORR- Multivariable Calculus

Instructor: **Joe Chen** (SET Primary Instructor)

Response Table

Student Evaluation of Teaching (SET)	
Raters	students
Responded	33
Invited	41
Response Ratio	80%

Section 1. Summary

Please respond to the following question about instructor Joe Chen.

Question	Course	Department	University	School
	Median	Median	Median	Median
The instructor presented the course material clearly.	5.0	4.3	4.4	4.4
The instructor was well prepared for class.	5.0	4.6	4.6	4.6
The instructor responded to questions adequately.	5.0	4.4	4.5	4.5
The instructor stimulated interest in the subject.	5.0	4.3	4.4	4.4
The instructor showed interest in helping students learn.	5.0	4.6	4.6	4.5
The instructor gave clear assignments.	5.0	4.6	4.5	4.5
The instructor was accessible to students.	5.0	4.6	4.5	4.5
The instructor gave useful feedback on my performance.	5.0	4.2	4.3	4.2
The instructor returned graded work in a reasonable amount of time.	5.0	4.6	4.5	4.5
The instructor used class time effectively.	5.0	4.5	4.5	4.5
The instructor treated all students with respect.	5.0	4.8	4.7	4.7
The instructor graded fairly.	5.0	4.7	4.5	4.5
The instructor's teaching methods promoted student learning.	5.0	4.4	4.4	4.3

What is your overall rating of Joe Chen's teaching?

Question	Course	Department	University	School
	Median	Median	Median	Median
What is your overall rating of the instructor's teaching?	5.0	4.2	4.0	4.0

Please respond to the following question about the course.

Question	Course	Department	University	School
	Median	Median	Median	Median
The methods of evaluating student learning seemed appropriate.	5.0	4.4	4.3	4.3
The course content was well organized.	5.0	4.4	4.3	4.3
The course objectives were clear.	5.0	4.4	4.4	4.3
The course objectives were met.	5.0	4.4	4.4	4.3
The textbook made a valuable contribution.	3.0	4.0	4.0	4.0
The other course materials made a valuable contribution.	5.0	4.2	4.3	4.3
The pace of the course seemed appropriate.	5.0	4.3	4.3	4.2

What is your overall rating of the course?

Question	Course	Department	University	School
	Median	Median	Median	Median
What is your overall rating of the course?	4.0	3.8	3.7	3.7

Section 2. Student Information

What is your Academic Level?

Options	Count	Percentage
Freshman	17	52%
Sophomore	11	33%
Junior	5	15%
Senior	0	0%
Graduate	0	0%
Other	0	0%

What is your expected grade in this course?

Options	Count	Percentage
A	15	45%
B	16	48%
C	1	3%
D	0	0%
F	0	0%
Pass	0	0%
Fail	0	0%
Other	1	3%

What is your cumulative average (GPA)?

Options	Count	Percentage
3.5 and above	10	31%
3.0-3.4	17	53%
2.5-2.9	4	13%
2.0-2.4	1	3%
< 2.0	0	0%

How many times did you miss this class?

Options	Count	Percentage
0-2	21	66%
3-4	10	31%
5-6	0	0%
> 6	1	3%

Section 2. Student Information (continued)

On average, how many hours a week did you spend outside of class preparing for this course?

Options	Count	Percentage
0	0	0%
1-3	10	30%
4-6	18	55%
7-9	4	12%
10-14	1	3%
15+	0	0%

Which best describes this course for you?

Options	Count	Percentage
Requirement for my major	30	91%
General Education Requirement	2	6%
Other Requirement	1	3%
Elective	0	0%
Elective for major	0	0%

My desire to take this course was:

Options	Count	Percentage
Much more than most courses	2	6%
More than most courses	13	39%
About the same as most courses	16	48%
Less than most courses	2	6%
Much less than most courses	0	0%

For me, the level of difficulty of the course content was:

Options	Count	Percentage
Much more than most courses	1	3%
More than most courses	12	36%
About the same as most courses	16	48%
Less than most courses	4	12%
Much less than most courses	0	0%

Section 2. Student Information (continued)

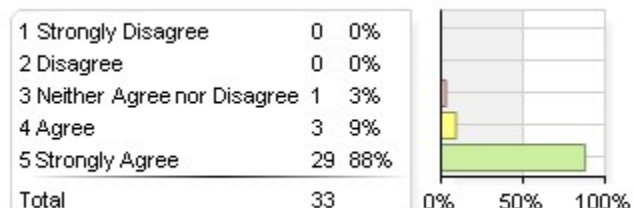
Overall, how much do you feel you've learned in this course?

Options	Count	Percentage
Much more than most courses	4	12%
More than most courses	21	64%
About the same as most courses	8	24%
Less than most courses	0	0%
Much less than most courses	0	0%

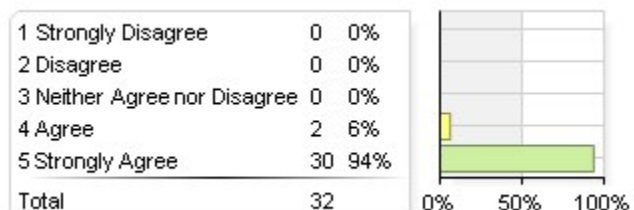
Section 3. Questions About the Instructor

Please respond to the following question about instructor Joe Chen.

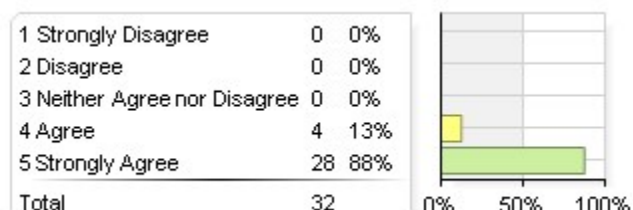
1. The instructor presented the course material clearly.



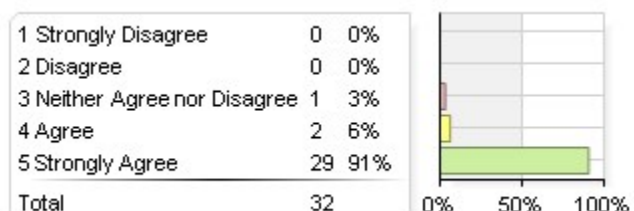
2. The instructor was well prepared for class.



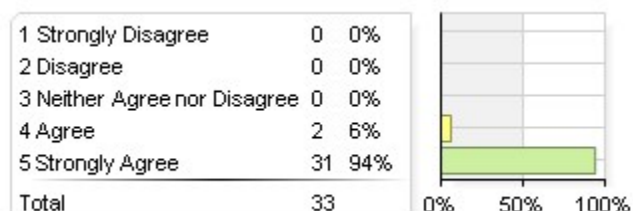
3. The instructor responded to questions adequately.



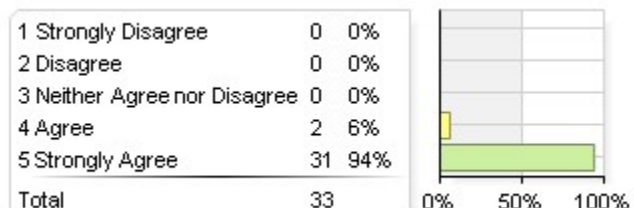
4. The instructor stimulated interest in the subject.



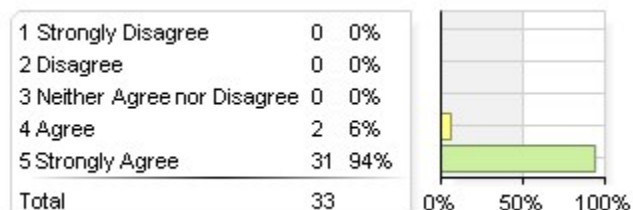
5. The instructor showed interest in helping students learn.



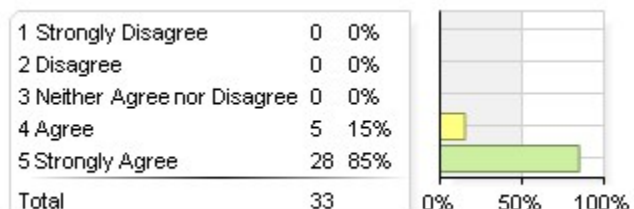
6. The instructor gave clear assignments.



7. The instructor was accessible to students.

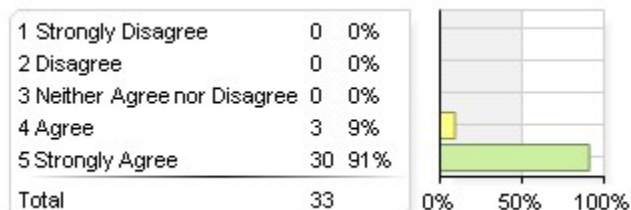


8. The instructor gave useful feedback on my performance.

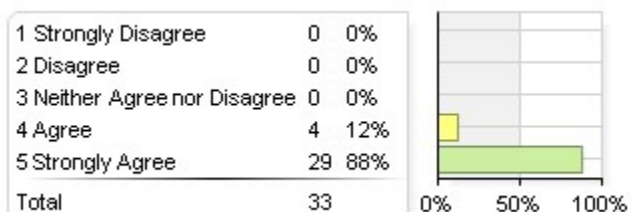


Please respond to the following question about instructor Joe Chen. (continued)

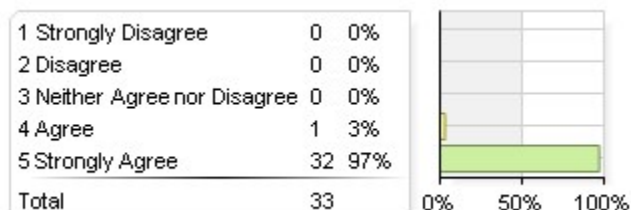
9. The instructor returned graded work in a reasonable amount of time.



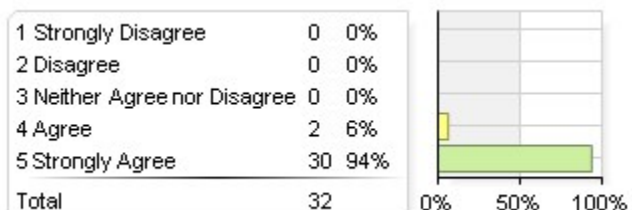
10. The instructor used class time effectively.



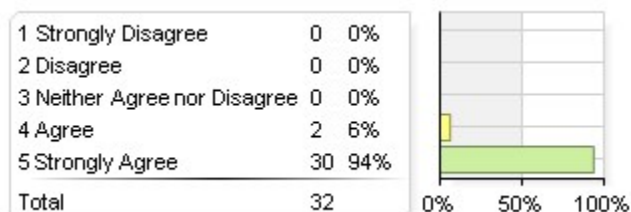
11. The instructor treated all students with respect.



12. The instructor graded fairly.



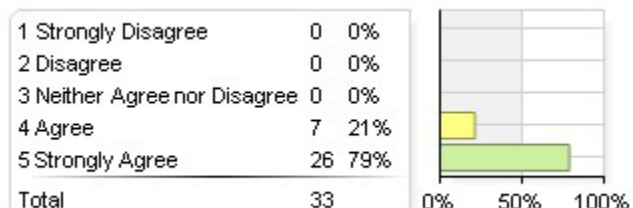
13. The instructor's teaching methods promoted student learning.



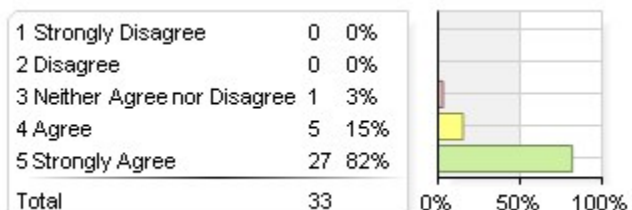
Section 4. Questions About the Course

Please respond to the following question about the course.

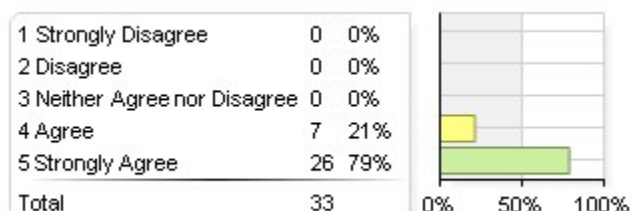
1. The methods of evaluating student learning seemed appropriate.



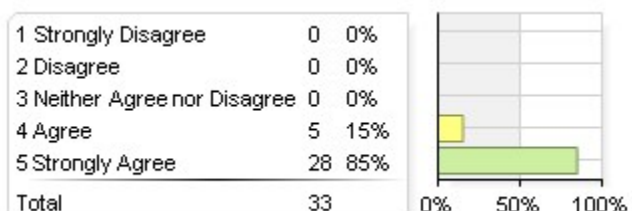
2. The course content was well organized.



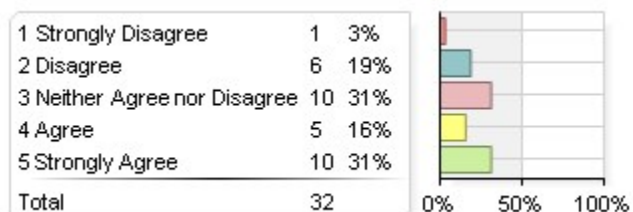
3. The course objectives were clear.



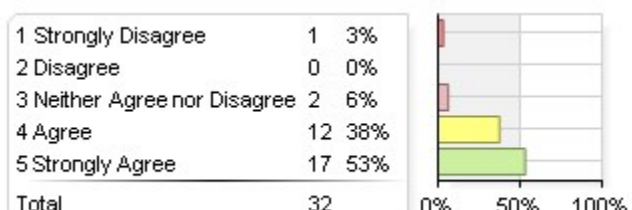
4. The course objectives were met.



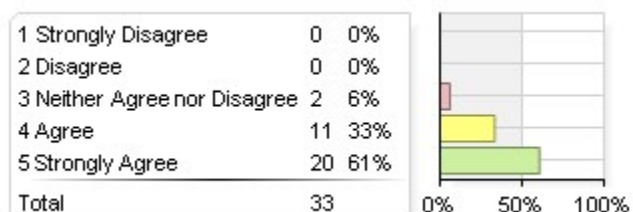
5. The textbook made a valuable contribution.



6. The other course materials made a valuable contribution.



7. The pace of the course seemed appropriate.

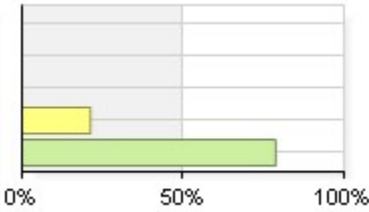


Section 5. Aggregate Report on "Overall Questions"

Overall Rating

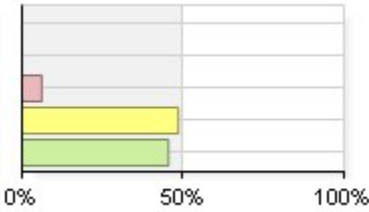
1. What is your overall rating of the instructor's teaching?

1 Poor	0	0%
2 Fair	0	0%
3 Good	0	0%
4 Very Good	7	21%
5 Excellent	26	79%
Total	33	



2. What is your overall rating of the course?

1 Poor	0	0%
2 Fair	0	0%
3 Good	2	6%
4 Very Good	16	48%
5 Excellent	15	45%
Total	33	



Overall Rating

Question	Good, Very Good & Excellent	Very Good & Excellent	Excellent
What is your overall rating of the instructor's teaching?	100%	100%	79%
What is your overall rating of the course?	100%	94%	45%

Section 6. Comments

What was the most positive aspect of the way in which this instructor taught this course?

Comment
Everything that Joe P. Chen does is positively incredible. He is one of the top professors at this institution, it is obvious that he loves what he does!
This instructor, unlike some others, did not make assignments and tests ridiculously hard so that the average was failing or just above failing, rather, he made it possible to get good grades on everything which really kept me motivated and happy with my performance.
Super enthusiastic and really helpful.
Very enthusiastic
Real world examples and donuts
Very hands-on and explained everything
he was always really enthusiastic and excited for class. he was really clear in his explanations and his stories and personality made class a lot of fun. he is such a fun guy to have as a professor.
The instructor was very interesting and made sure to gain student's interest by incorporating current events into lectures.
He emphasized concepts over calculations
Through careful examples done out in class
Explaining the theorems in depth and always being flexible about exams and understanding what the students are going through was awesome.
Humor
Professor Chen is exceedingly funny, and an excellent teacher. His examples were very helpful, and honestly entertaining to watch him solve. Keep up with the pop culture references!
Professor Chen is always positive and tries to lighten the mood whenever possible. He knows when to be serious and when he can make jokes without getting off topic. He is very clear in his instruction and always incorporates a relevant example to help explain things to his students.
The Co-Ops are great because you are actually doing problems in class before you have to do them by yourself at home
He was very helpful and extremely knowledgeable about the topic. He was very capable of giving clear explanations as to how we should solve problems, and kept us interested in the material throughout each class period.
Joe Chen was an excellent professor. He could thoroughly prove mathematical concepts and exemplify how to put these concepts to use. He understood that we are very busy students and was lenient with due dates. Having "cheat sheets" during exams made exams much more fair and made it so that students who thoroughly prepared for the exam could succeed (he didn't try to give any trick questions).
The fact the professor chen tried his best to make the course fun, especially by incorporating social aspects like uconn basketball into the course. his effort in making the stuff we learn applicable to realistic situations. I feel he went above and beyond to be accessible to students, especially with piazza, and the pre-exam study/review sessions. His flexibility and understanding of people's situations was also excellent.
Joe was always available to help everyone and greatly encouraged asking questions to not only him, but our fellow classmates. He really instilled a feeling of unity in the classroom and always wanted us to communicate frequently with each other. In this way, we not only learned from him, but everyone else in the class. He was always reasonable about giving us the appropriate amount of time to do our homework and work outside of the classroom. The class was composed of challenging information to learn, but I feel strongly that through Joe's methods I not only learned enough to be confident in Multivariable Calc, but I also earned an appropriate grade to the amount of work I put in.
Joe Chen was very sure to keep the students interested, making as many references to topics which we would find interesting as possible. He found a perfect blend of kindness, fair grading, and truly teaching the material.

He was very clear and well organized. He taught in a way that made it very easy to understand.

Professor Chen conveyed the material in the course in a clear concise manner. He also was frequently available to help students when they asked. If he felt the material wasn't covered well enough he would ask the class if we needed more of an explanation, and would then proceed to clarify any confusion.

Discussion (CO-OP) helped alot

The instructor was able to derive every single formula we used to make sure we understand what we're doing is relevant. He's a very smart guy, and gives us challenging problems to do on homework assignments, but is very willing to meet with students so he can help us out. He's also pretty funny.

Really taught it in a way that was conducive to learning. From day one, he went out of his way to make connections between the course material and our lives as college students, which made the material easier to learn and comprehend. I always dread math courses because I have a hard time understanding the concepts and theorems, but having Joe as a professor has actually made me enjoy math for the first time because I'm finally understanding it, mostly due to his excellent teaching abilities. He is also incredibly helpful, and I am less stressed out about my grades in this class than with most other classes, which also makes it easier to focus on actually learning the material.

Very lenient and willing to help and work with the students with homework and deadlines. Very enthusiastic and knowledgeable about the class and the content. Very easy to talk to and made the class fun by making fun references, Tests were very fair and we were well prepared. Always available to students.

He tried to grab our attention towards the subject by incorporating stuff that we are into(our generation).

He is a great professor who teaches well and still makes the class interesting and keeps us engaged.

Through laughter

Joe's attitude towards his students, very open to debate and very flexible.

Very intellectual and related concepts in class to pop culture to make the class interesting

Being attractive in teaching and talks funny.

What can this instructor do to improve teaching effectiveness in the classroom?

Comment

Just keep doing you, professor!

Nothing. By far my favorite professor so far at UConn.

more examples, maybe.

Stay on topic

More donuts

The answers to the homework after it was due would have been helpful

nothing. he is my favorite professor thus far and is probably one of the best at uconn.

His handwriting is difficult to read which caused difficulty when taking notes and understanding lectures.

I personally got lost in some of his derivations and then ended up confused because I didn't know how to apply the equations.

By having a 'medium' difficulty example prepared ahead of time. The easy intro examples were awesome and totally necessary, but there is a step missing between the easy and hard.

There is very little that can be done to improve greatness.

Maybe make the homework for clear. Sometime it is hard for international students to understand the homework assignment.

Nothing. It is literally impossible for him to improve his class.

The class is good the way it is. Maybe he could go over drawing certain figures more. I think a lot of people struggled with that.

I know this is a fast paced course, but I think the instructor could spread out the hard material more by condensing simpler material at the beginning of the semester.

Maybe do less derivations of equations or theorems. I agree it is very nice to understand how they came about, but

sometimes it can be confusing.
Keep doing what you do, there is no need for improvement.
perhaps my only suggestion would be covering examples in lecture a little more thoroughly.
There was a lot of material to get through, so sometimes we focused more on getting the general ideas down instead of doing enough examples to feel comfortable with that information.
Keep doing what he's doing. He is excellent.
Nothing.
There is not much professor Chen can do to improve his effectiveness, he has a very good teaching style and promotes learning.
post notes online
Perhaps slow down a little. Most of the times in class I'm focusing more on writing what's on the board then listening to what the instructor has to say about the topic
Perhaps make the questions on the written assignments similar to what will be seen on the exams. Sometimes, they are a bit of a stretch and really difficult to complete. Granted, I'm sure working together on them would probably be useful, they are tough to get through individually, especially when it comes to certain concepts, theorems, derivations, and proofs.
He does a lot of derivations of equations which is very helpful to understand why we use them, but sometimes I didn't realize we were doing derivations and thought it was a very complex problem-- so just iterating that it is a derivation (not one we will be tested on) would be the only change I can think of.
more donuts
I don't know
He writes a lot on the board, and it would help if he emphasized definitions that should definitely be written down vs examples which you should just pay attention to.
Assign more book work
could spend more time explaining the written assignment

Please write any comments you have about the course or course materials.

Comment
It is challenging, but Joe P Chen really helps every student to the best of his abilities
I already had the textbook from a previous course, but it really wasn't necessary for this class.
Textbook wasn't really needed
I liked how you included how certain concepts in calc 3 were applied to physics but I felt it made me more confused at some points during the semester.
It is getting harder towards the end, but otherwise, it's good.
This course is honestly one of the easiest in the sequence of basic calculus courses. It's very refreshing to take after Calc 2, and your grade in that class should not scare you off.
Granted, it's not a useless course, and I learned quite a lot.
The course seemed a lot more physics based than I thought with the vectors in the beginning of the semester.
This class was great because it is applying what we already know from single variable to multivariable to round out the whole picture.
It was hard, but I got through it.
I really enjoyed this course and I feel that the exams were very fair, as Joe said, he designs them so that it is completely possible to get an A on them.
Could easily be taught without assigning any textbook. I probably opened my book about twice.
The expensive textbook didn't seem necessary.
A little too much material for one course.
overall, the course is interesting. I like having homework and written assignments rather than quizzes because I

feel like I learn more that way. MyMathLab is really useful for this course, especially having multiple tries for each question and having the Study Plan to further understanding of particular concepts.

please have more answer sheet for the coop

This course is great and Joe is great. My favorite professor so far here at UCONN.

Great course

The course material is easy at first and becomes increasingly difficult. Certain aspects of partial derivatives could've used more attention. Line integrals could use more explanation conceptually.

The course is kinda hard, but the professor is awesome!

Not a very hard course. Some terms are complicated. Once you understand it will be really easy.

For courses with laboratory and/or discussion sections: were the laboratory/discussion sections helpful to your learning?

Comment

NA

yes! I really liked the co-op we have for the discussion once a week. it really helps me to understand the material better.

Yes

The discussion sections were helpful to my learning.

very much. Helped me understand the notes better.

Coops are helpful in learning the material.

There is no laboratory

The discussion section which was 50 minutes long was great, he gave us examples to do during this time which allowed us to grasp new material and understand how to approach problems.

There were none.

discussion co-ops were good

Yes! Very helpful!

Could you compare your experience with Calc III vs. your previous experience with Calc I & II? What particular things did you find more interesting or more challenging?

Comment
I liked the small class feel of calc three, I thought that the concepts were more difficult at time, and that setting really made it easier to grasp.
From my perspective, Calc III does not use much of Calc II which I found helpful since I did not enjoy Calc II.
the material is more difficult because of the vectors, but the teacher helps make it understandable
Calc III felt like a big step up in terms of difficulty, there was some "assumed knowledge" from Calc I & II that I was behind on.
I was more interested with the smaller class size
calc iii was more interesting to me because it was not as much confusing math and integrals.
I had a better experience with calculus III than with my previous experience with calculus II because the content was easier and the instructor was easier to comprehend.
I liked how Calc 3 focused more on concepts than just calculations in calc 2. It was also more about applying concepts than just solving integrals.
There was less BS in this class, it was more directed at the students and their learning
There is no quiz in this class, which make me feel more comfortable. I feel like I can study this course whenever I want. But not like: Oh there is a quiz tomorrow, I gotta study for it. What's more, the smaller class is watch much better than the lecture. Although the homework assignment sometimes drive me crazy, but i did learn a lot form it.
Calc III was a much better experience than Calc II for me. In my opinion, the concepts in Calc II are much more difficult to understand. Calc III makes more sense, and it's really cool to finally understand how to apply it to 3 dimensions, as now you can see where it's applied in the real world.
It can be a little challenging to visualize the problems in 3D at first, but once you've got that down, the course is lovely.
Calc III is significantly more interesting than Calc II but I think that is mostly because my professor for it last semester was not very good. It's less challenging than Calc II but that is because my professor is better, not because the material is easier.
This class ran a lot smoother and more linearly than my Calc I and II classes. The progression through the topic was nicely ordered. I really liked the optimization and constraint on a surface problems. This last section of flux and circulation was fun too. There were no topic I would say were more challenging than Calc I or II because it all builds off the basic knowledge.
I think multivariable isn't necessarily harder, there is just a lot more imagining that needs to be done. Such as grasping things in three dimensions. In terms of difficulty I feel as though it is equal to calc 2.
Calc III was a significantly better experience than calc II, and it is entirely because of the professor. Joe Chen was far better than my calc II professor from last semester and made the learning process so much more bearable.
The whole 3d aspect of calc 3 was both interesting and challenging. i found parametrizing and some physics-based problems a little challenging.
Calc I was very easy for me and I took it in high school. Calc II was either very easy or very difficult (specifically series). Calc III was neither too easy nor too difficult at any point, but was sufficiently challenging through out the course. It helps to be able to visualize the 3 dimensional graphs and shapes.
Calc III was better than Calc II in every way. The amount of homework assigned was much more reasonable. The material in Calc III is, in theory, more difficult than that of Calc II. However, I believe I speak for most of my classmates when I say I found it much easier to keep up with and much more interesting. Please keep Calc III as a classroom style class, not a jumbo lecture hall class like Calc II. The material is too challenging to be taught in the same way as Calc II.
I learned a lot more in multivariable calculus than I did in calculus II.
Calc III was easier for me than Calc I and Calc II, I feel this was because of the instructor.
much easier than calcII
I thought it was the same experience. For me, all Calc classes were the same, as they all brought up new topics

and ways to solve different problems. Perhaps Calc III was a bit tougher as it combined everything we had previously learned plus additional topics
calc III was a much better experience than both calc I and II. I enjoyed having a smaller classroom atmosphere and the material was presented much more clearly and interestingly. I think the background from the first two calc classes proved to be very helpful as well. I found double and triple integrals as well as integration with respect to a certain variable, and determinants to be interesting and limits and parameterization of surfaces to be challenging
Built upon calc 1 and 2. Worked in more dimensions, so more challenging but if you had a good calc 1 and 2 base it was manageable.
This class incorporated more challenging materials, that had calc 1 and calc 2 touched in. But it was more interesting compared to the other.
I took calc 1 in high school so it is hard to compare and calc 2 was a bad experience with a bad professor first semester so this class is amazing.
They were about the same
Well, some integration techniques learned in calc II can come in handy but are often unneeded.. Calc III explores more interesting concepts certainly such as partial derivatives and gradients. Much more applicable to real life.
Calc 3 was interesting and took concept from 1 and 2 and put then in 3 dimensional space
In 3D
The change from 2D to 3D is challenging but interesting.

How did you like the weekly co-op problem-solving sessions? Any suggestion on how to improve them?

Comment
I thought that they were very helpful, I don't really know what else to say about them.
If we spent a little more time going over the answers at the end of class, that would be helpful.
They were super helpful!
Unfortunately I could not attend these.
Yes I liked them, no improvements
the co-op was extremely helpful in solving problems and working together for practice
I liked the co-op problem-solving sessions but they could be improved by having a more structured class that integrated group work with instructor explanation.
The Co-ops were very good. They brought the class together so everyone could help each other through the problems.
I wasn't a huge fan, but they are useful.
Co-ops are a nice way to switch it up in the middle of the week and were great.
Great session. Should keep it up.
The co-op sessions were wonderful. It was an excellent way to make sure we actually understood the concepts, and get help from Professor Chen or other students if we needed it. I don't know if they really need that much improvment.
I think the co-op sessions are great because it gives you an opportunity to work out all your problems and really get a feel for the material. I always learned more by doing so I think it helps me retain the information.
They were awesome. If they were more like the questions on the homeworks and exam, it would be nice rather than theoretical type questions. Even though I like the theory part of math, I think the in class sessions could be better used for a chance to see what we need to know how to do for the section.
I thought they were perfect. Nothing should be changed with the co-op.
They were good, but I would like it if the problems were a little more like what we would see on exams and less like the written assignments.
Yes they were great.
They were fine, but it might be better to assign groups each week so that everyone gets a chance to work with

different people each week.
They were very helpful.
I liked the weekly co-op sessions. They were a nice break in between lectures, and doing problems out was very helpful.
I enjoyed the weekly co-op sessions, they gave us a chance to work with the types of problems we were expected to solve with direct access to professor Chen if we were unsure of how to proceed with an exercise.
alot, they were good for making sure we understood what we were doing
They were good! Some of the problems were challenging, but the instructor would go over them at the end of class to ensure we learned the material
I didn't particularly like the group style work in the co-ops because it was very fast paced at times and stressed me out to the point where I really couldn't get much out of them. I think it is more of a personal thing, but sometimes it takes me longer to think and work through problems, and being in a group that got through the problems very quickly sometimes made me feel incompetent so i did not attend co-op most weeks. I would push to make it more like a discussion section where you go over problems that people may have struggled with on the homework or go through the coop problems, and let people problem solve more so outside of class.
I enjoyed them. It gave me a chance to understand and absorb the material learned in lecutre as well as a time to discuss with other students/teacher and it was good practice problemws.
Its nice to have, cause it help us actually use the theorems in challenging problems.
I like the coop because it gives a break in lecture and helps put what we learned into practice.
It was useful
The co-op solving sessions were different. Working in groups had it's benefits but it also had the potential to be unproductive since the co-op assignments didn't seem as important. To improve them maybe you could have the students use the board and work together as a class.
The co-ops are very very useful and should be utilized by all instructors when possible
Very helpful! like them!
I like the co-op problem very much. I gives much more detailed problems about the materials we learn during the week and help us to practice the MML problems.

If you are to give (constructive) advice to a future student of Calc III, what would be your advice?

Comment
Don't fall behind because it all builds on itself, if you need help, the professors are wonderful, especially Joe P Chen, so ask them for help, they will help you and it is definitely worth it.
Take it with Joe Chen, you won't regret it.
It helps to reinforce the material if you skim the book before exams.
Do the homework
Take it with Joe Chen
The homework is very important.
Use the book. It helps a lot more in calc 3 unlike calc 2.
Be very careful on the homework and know WHY you did everything
Don't cheat the my math lab problems.
Talk to Professor Chen. He is the real man. He knows how to teach and teach well.
Learn how to use MATLAB or Mathematica. It's really useful to know regardless, and the programs can help quite a bit on some of the more difficult homework problems. At the very least, it helps to graph quartic functions and see how they exist in 3-D space.
Take Professor Chen and make sure you do your homework.
Pay attention in class because that is really when you learn. You won't want to put in the effort and learn it on your own time, plus the professor is there to teach you.

Make sure you really understand the concepts involved in the problems, makes it much easier to understand what a question is asking.

Try to get Joe Chen as your professor.

take it with joe chen, and be ready for a challenge, and set aside adequate time to practice and do homework.

Reading the book can sometimes help, but overall nothing beats just dedicating a few hours a week to just practicing. The exams are fair, so just make sure you have a good 'cheat sheet' and you should be fine.

Take the best class notes you can and never miss a class.

Stay on top of the topics and focus a lot on the homework.

If you can take Calc III with professor Chen take it, even if it makes your schedule a mess, it's worth it. He is a very fair instructor and makes learning Calc III enjoyable.

keep up with everything and make sure you do all homeworks and go to ALL classes

Review stuff from calc I and calc II. Don't fall behind

Don't give up after Calc II, take Calc III with Joe Chen, make sure your integration skills are on point. Just because you are done with Calc I and II doesn't mean you can just forget all of that information. You use what you have already learned to apply it to the 3-D world and connect it to things around you in daily life. Also, would recommend taking physics 1 prior to or concurrently, it'll be useful!

Undertsand how/why you are doing the questions, dont just memorize. So you will be able to do the question even if it qas worded differently

Do all the homework and you should be fine

Make sure to pay attention in class and do practice problems to help better understand the material.

Nothing

Spend time actually studying, you can only remember so much without studying.

Read the book and do similar problems from the book

Attend each classes.