

CSS 422 B
Hardware And Computer Organization
Course type: Face-to-Face

Evaluation Delivery: Online
Evaluation Form: A
Responses: 38/43 (88% very high)

Taught by: Yusuf Pisan
Instructor Evaluated: Yusuf Pisan-Assoc T Prof

Overall Summative Rating represents the combined responses of students to the four global summative items and is presented to provide an overall index of the class's quality:

Median 3.9 (0=lowest; 5=highest)	College Decile 3 (0=lowest; 9=highest)
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Challenge and Engagement Index (CEI) combines student responses to several IASystem items relating to how academically challenging students found the course to be and how engaged they were:

CEI: 5.9 (1=lowest; 7=highest)
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SUMMATIVE ITEMS

	N	Excellent (5)	Very Good (4)	Good (3)	Fair (2)	Poor (1)	Very Poor (0)	Median	DECILE RANK	
									Inst	College
The course as a whole was:	38	29%	34%	24%	11%	3%		3.9	3	4
The course content was:	38	32%	26%	29%	11%	3%		3.8	2	3
The instructor's contribution to the course was:	38	47%	26%	21%	3%	3%		4.4	4	5
The instructor's effectiveness in teaching the subject matter was:	38	26%	32%	34%	5%		3%	3.8	2	3

STUDENT ENGAGEMENT

	N	Much Higher			Average			Much Lower		DECILE RANK	
		(7)	(6)	(5)	(4)	(3)	(2)	(1)	Median	Inst	College
Relative to other college courses you have taken:											
Do you expect your grade in this course to be:	37	8%	11%	14%	32%	14%	11%	11%	4.0	0	0
The intellectual challenge presented was:	37	54%	30%	11%	5%				6.6	9	9
The amount of effort you put into this course was:	37	43%	30%	11%	14%	3%			6.3	8	8
The amount of effort to succeed in this course was:	37	51%	22%	11%	16%				6.5	9	8
Your involvement in course (doing assignments, attending classes, etc.) was:	37	35%	27%	11%	27%				6.0	5	5

On average, how many hours per week have you spent on this course, including attending classes, doing readings, reviewing notes, writing papers and any other course related work?

Class median: 12.2 Hours per credit: 2.5 (N=37)

Under 2	2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-17	18-19	20-21	22 or more
		11%	14%	5%	16%	11%	24%	3%		8%	8%

From the total average hours above, how many do you consider were valuable in advancing your education?

Class median: 8.9 Hours per credit: 1.8 (N=37)

Under 2	2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-17	18-19	20-21	22 or more
	5%	11%	24%	14%	22%	11%	3%	8%		3%	

What grade do you expect in this course?

Class median: 2.9 (N=36)

A (3.9-4.0)	A- (3.5-3.8)	B+ (3.2-3.4)	B (2.9-3.1)	B- (2.5-2.8)	C+ (2.2-2.4)	C (1.9-2.1)	C- (1.5-1.8)	D+ (1.2-1.4)	D (0.9-1.1)	D- (0.7-0.8)	E (0.0)	Pass	Credit	No Credit
11%	17%	11%	14%	11%	19%	6%	6%		3%					3%

In regard to your academic program, is this course best described as:

(N=37)

In your major	A core/distribution requirement	An elective	In your minor	A program requirement	Other
65%	32%			3%	

STANDARD FORMATIVE ITEMS

	N	Excellent (5)	Very Good (4)	Good (3)	Fair (2)	Poor (1)	Very Poor (0)	Median	DECILE RANK	
									Inst	College
Course organization was:	37	41%	24%	27%	8%			4.1	4	5
Clarity of instructor's voice was:	37	30%	35%	27%	3%	3%	3%	3.9	2	3
Explanations by instructor were:	37	30%	27%	27%	8%	5%	3%	3.8	2	3
Instructor's ability to present alternative explanations when needed was:	37	38%	16%	24%	16%	3%	3%	3.8	2	3
Instructor's use of examples and illustrations was:	37	38%	16%	27%	14%	5%		3.8	1	2
Quality of questions or problems raised by the instructor was:	37	30%	19%	35%	14%	3%		3.5	1	1
Student confidence in instructor's knowledge was:	37	35%	19%	24%	16%	5%		3.7	0	1
Instructor's enthusiasm was:	37	43%	41%	11%	3%	3%		4.3	2	4
Encouragement given students to express themselves was:	37	46%	24%	14%	14%	3%		4.3	3	4
Answers to student questions were:	36	44%	17%	22%	14%	3%		4.2	3	4
Availability of extra help when needed was:	36	61%	17%	14%	8%			4.7	6	7
Use of class time was:	37	49%	27%	19%	3%	3%		4.5	5	6
Instructor's interest in whether students learned was:	37	43%	24%	24%	5%	3%		4.2	3	4
Amount you learned in the course was:	37	41%	30%	19%	8%	3%		4.2	4	5
Relevance and usefulness of course content were:	37	30%	27%	30%	11%	3%		3.8	1	2
Evaluative and grading techniques (tests, papers, projects, etc.) were:	37	38%	30%	22%	8%	3%		4.1	3	4
Reasonableness of assigned work was:	37	43%	22%	19%	14%	3%		4.2	3	5
Clarity of student responsibilities and requirements was:	37	49%	30%	14%	8%			4.5	4	5

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STANDARD OPEN-ENDED QUESTIONS

Was this class intellectually stimulating? Did it stretch your thinking? Why or why not?

1. It did because it was a new subject I hadn't known about in the past.
2. Yes.
3. Yes it made me think about how the contents connected to my past classes.
4. Yes. It challenged the way I think about programming and filled in gaps between physics classes and high-level programming classes. It was challenging because the concepts are quite abstract, despite being closer to the actual interaction of a computer's hardware than other programming classes.
5. Yes. There was a lot to learn and it all tied together.
6. This class was probably one of the most intellectually stimulating classes I have ever taken. I was introduced so many new topics that I have never learned before and forced to learn a entire new programming language called ARM assembly which was very difficult.
7. Yes, this class was very intellectually stimulating as you would have to understand the ins and outs of hardware and how it connects to software/memory. Making it very difficult.
8. Yeah, Assembly and architecture are fascinating and it helps understand more about why we do certain things and why we write code the way we do
9. Yes , because this was not just a regular class where you build off your learning from high school or introductory classes. this was a very new class to learn off from and also apply that knoweldge on the hw and projects
10. I had to out of the box and most of the times, every question challenged my entire knowledge of a certain concept.
11. Yes, it really did stretch my thinking. It was crazy learning about how computers work and store data. Assembly language was also very interesting to learn. It was challenging but I genuinely enjoyed it.
12. The class was very intellectually stimulating due to the new material taught not previously seen in other Computer Science classes (assembly programming) and due to the fact that the material covered was very difficult.
13. I did think it was very stimulating. So much so that it became overwhelming at times. I feel like the class time needs to be better spent on understanding the fundamentals instead of jumping topics rapidly and teaching rather than forcing people to self-learn.
14. It very much did. It was a coding language that I had never seen anything like before. But with certain concepts, it was fun.
16. Yes because of content in the course. It requires a lot of thinking.
17. This is a very hard class, arguably the hardest of the CS major core classes. Professor Pisan did a poor job of teaching the material in a manner that made the content easy to conceptualize. Given the fact that we are also CS majors, hardware is rarely a thing with think about in this detail. Professor Pisan did not do a good job of making the early content easy to understand which made it much more difficult to understand any later content
18. Yes, It was a new topic from what we have and it was very intellectually stimulating.
19. Overall, the course was very stimulating and covered a lot of concepts that I didn't know but found very enlightening.
20. Yes it was, It took a lot of effort and made me think a lot.
21. Yes, learend new projects and collaboration with teammates
22. The class was intellectually stimulating. The concepts are new and require iterative sessions of studying and review to understand
23. This class was very intellectually stimulating. This class was probably one of the hardest I have taken at UWB. Throughout the quarter I was struggling again to learn a new language but I was able to slowly grasp a better understanding of it
24. Yeah the class was very challenging.
25. The assembly sections in the class was the most stimulating. Assembly wasn't intuitive and still isn't, but the language is just hard to understand the ins and outs of everything. I have prior experience with boolean algebra, state machines, circuits, etc.
26. Yes as it was very difficult and alot of the topics were very different to those from previous classes.
27. It really stretched my thinking. There was a lot to learn in a short period of time and some concepts that took a lot of effort to understand
28. Yes it was intellectually stimulating. It stretched my thinking and understanding of how computers work, memory is organized and accessed, as well as basic assembly and how it relates to more common languages such as C.
29. The class contents was for sure challenging and hard to understand, it is higher level of abstraction I am not familiar with.
30. This was a challenging course and I learned a lot. While I don't have a particular interest in hardware, Professor Pisan made this class very engaging and interesting. I had a lot of fun learning the materials of this class.
31. Yes, new learning a new language was both interesting and i could see how it could be used in my future.
32. Yes it was because it got me to think outside the box on circuits and assembly.

What aspects of this class contributed most to your learning?

1. Homework assignments
2. Assembly and Curcuits
3. The exercises in class.
4. Stepping through the final project in chunks was massive. The commenting portion of the assignment was integral to being able to understand the rest of it. In-class assignments were helpful. The software like logisim and keil were great. Visual sucked. It was too clunky.
5. The homework assignments were helpful in teaching me to apply the information.
6. The homework assignments helped me the most with making sure I understood concepts from class.
7. The group work/discussions.
8. As always the in class practice problems were VERY helpful. Helped me make sure I actually understood the material. Splitting up the project to an individual project in multiple parts was also super helpful in making it less stressful and actually really fun!
9. in class exercises
10. Class involvement, homework, exercises, project
11. I really liked how we had class exercises. Thanks to doing exercises, I was able to comprehend the material better. Discussing the material with groupmates I was assigned with, also helped me grasp a better understanding. Also I loved how we were assigned to random groups in each exercise! That was exciting for no reason and helped me focus on the exercises better.
12. The reinforcement exercises where we did problems related to the content covered in class helped immensely with understanding what was taught in class.
13. Discussions and group work were tremendously beneficial and enjoyable. I was glad that I was able to interact with other students and learn from them. I think the teacher is a nice person who does try his best to help his students. I have taken him for other classes and enjoy his enthusiasm and passion to teach.
14. I would say that the homework was great as it challenged our knowledge of the concepts. If we thought we fully knew something, the homework assignments would make us think otherwise and learn further.
15. I thought the lectures, especially the ones with visual examples either on slides or provided by the professor were really good.
16. The homeworks and class exercises.
17. Honestly, very little. I appreciate that lectures were recorded however.
18. The lectures.
19. Understanding ASM and how the CPU is used by the computer system.
20. Group excises helped me learn the most.
21. Projects
22. The written homework really tested if I knew the material
23. One of the things that contributed most to my learning was how interactive the class was. The group exercises that were done throughout the course was very helpful. Another thing that helped was the instructor reviewing any questions about homework problems step-by-step and his reasoning behind each step was very useful.
24. Group exercises to practice course content.
25. The value of understanding the size of data and how it is organized in memory. This is a very useful topic to help in making efficient code that is also takes up as little memory as possible.
26. Homeworks
27. The homework helped the most
28. Homeworks and Final projects.
29. In class group collaboration was something that helped me learned, all the exercises we did during class and going over them in class solutions was very beneficial.
30. The exercises/homework - gave me firsthand experience with the concepts and I got to know my classmates a little better. The final project was a lot of fun.
31. The homework assignment and the final project
32. Assembly and circuits.

What aspects of this class detracted from your learning?

2. None
3. Nothing
4. People coming in late for class. Man that was EXTREMELY distracting!
5. The project wasn't the best in terms of helping me learn assembly.
6. The Final project was very interesting, however the last part is very difficult and not entirely clear. Separating the final project into 4 parts was super helpful, however the last part was very very overwhelming.
7. Just had some conflicts with other students that detracted from my learning in class
8. I think the fact that this was Pisan's first time teaching 422 certainly showed. There were some times in class where everyone, including him, were just confused. I also think that some of the concepts that are really important to understanding how assembly programing is structured were glossed over quite quickly. also the fact that the Berger readings weren't listed on the schedule meant when they randomly appeared, it caught me off guard. I never ended up doing those readings, because they never ended up on my plan for the quarter.

9. none
10. Class timings constantly clashed with my work schedule. I skipped work for 2 hours almost every time I was present in class.
11. I didn't like the beginning of the lectures. Let me explain what I mean by that. So, at the beginning of the lectures we would just start learning the material such as jk flips, circuits, boolean algebra, but not learn what they are actually used for until the end of the lecture. Learning the context of what we are gonna learn before we start learning more detailed information is a better way of approaching the subjects in my opinion (I actually remember reading something about this in a book). I wish in the lectures there was a higher emphasize on "what" we are learning "why" we are learning it and "how" we are going to use it.
12. I feel like the class was a little rushed and that some pieces of material were not given sufficient time to be covered.
13. The overall structure and pace of the class is quite rapid, and topics are not given enough time to really help students hone their understanding. Everybody crams their schedules in finals week to learn and go sleepless before exams. I don't think this is a healthy way of learning.
14. I would say so far the midterm exam (have not taken the final yet). It was nothing like the practice in my opinion and the questions were worded in a way that we have not seen in the exercises, homework, and the sample midterm. That exam was the worst exam score I have ever received.
16. None it was all pretty good.
17. The content was taught in a very fast paced manner. I was also not a fan of the ARM architecture, I would have preferred learning about the x86 architecture as there are more resources currently out there for that architecture.
18. Nothing.
19. None
20. The hard exams and confusing homework. I also thought the lectures lacked effort.
21. Homework
22. I wish there was more time to study between the final project and the final exam.
23. No aspects from this class detracted from my learning
24. Lots of content that didn't seem 100% correlated. EX: no use of assembly in 2nd half of course yet final project is in assembly.
25. The class material at times, was not engaging, but that is not because of the professor. Just the material.
26. N/A
27. Reading through the textbook was challenging, especially the length that takes a long time to read
28. Rushed in class discussions.
29. To much content on slides with details or information I dont know where it comes from.
30. The grading of midterms and final was harsh, especially with no curve. I also found the wording of the midterm questions very confusing and jarring.
32. Memory specifics.

What suggestions do you have for improving the class?

1. I wish the class had the opportunity for extra credit. There sadly was none available for the entire quarter
2. None
3. N/A
4. More homework. Less reading. More detailed explanations in class. I understand that it's challenging to cover a lot of ground in class and there's an expectation that students will read and come to class ready to engage and learn through that avenue. But that's not the reality of what happened this quarter. Being assigned 100 pages of reading and being expected to come to class ready to ask questions is not realistic. There's just too much reading to be done and what frequently happens with students is they just don't do any reading at all and hope to skim by on just the lectures and slides. The result is that the professor just burns through slides and gets zero questions and doesn't know where to focus their efforts to fill in gaps for students. My suggestion is for the professor is to slow down and explain concepts more thoroughly. Truthfully, people aren't asking questions because they have no idea what's going on. I heartily suggest restructuring the teaching approach to something more along the lines of: teach the concept, assign some homework and reinforcement reading, begin the next class session with an in-class exercise. Treating lectures as the reinforcement portion of out-of-class learning didn't work for me and some others this quarter.
5. In the past smaller assignments like the leetcode were a lot more helpful in teaching.
6. Provide more resources to aid with understanding of assignments.
7. If students can choose to work individually or with a group for discussion/group work
8. I would put a bit more emphasis the material in Chapter 4 of Null, and Chapter 2-Chapter 4 of the ARM book. I think understanding the different ways that computer can be organized, and how the cortex M processor is designed, is really important to understanding ARM Thumb2 code. This probably needs 2 whole lectures in my opinion, whereas the hex and binary math maybe only needs 1 lecture. Going though the architecture in depth before showing any code I think would have helped avoid a lot of confusion when first showing an example assembly programs, and would have helped understand the example programs we did. I think those few chapters, along with Null 3, were what helped me the most with learning the material for this course.
9. better visuals in the powerpoints.
10. Exam questions were nowhere near to the questions we practiced in classes. They were relatively more advanced than what we are used to.
11. Easier midterm, more extra credit opportunities, more interesting lectures
12. Provide textbook chapters related to content about to be covered in class and make exam questions similar to problems encountered in class.
13. I hope more time can be spent on each topic and more examples can be given on fundamentals for those who have a tough time grasping certain topics.
14. Everything in this class was great besides the exam as previously discussed. I hope that the final will be better as the professor has acknowledged that the midterm was not great for the majority of the class. But besides the exams, everything in the class was great and I did learn a lot.

15. Have exam problems that are at least similar to what the students have learned in class.
16. Make more preparations for midterms and tests. Felt a little under prepared for each test.
17. Assigned ready homework/notes. It'd force students to read the textbook which greatly helps understanding of the material.
18. I don't have any suggestions.
19. None. Professor Pisan did an excellent job structuring the material and providing ample opportunity for students to succeed! Hats off to him for his first time teaching this course!
20. Please put more effort into the lectures and draw things out rather than using another professors slide deck.
22. make the due date project at least a week before the final due date
23. I have no suggestions
24. This has nothing to do with the professor's teaching, as I feel he did a very good job, especially given this is his first time teaching the class. However, this class seems unnecessary for a lot of software engineering jobs. I think that its inclusion in the CSSE major is a bit outdated and it would make more sense if a more modern topic, such as AI or cloud computing replaced this course requirement.
25. This was a great course to take and was a much better experience than others talk about with other teachers. Since this is the first time you are teaching the course, of course, there is organizational and quirks to be worked out. Splitting out the final project was one of the best choices for the structure of the course.
26. Overall very difficult class. Cant think of a way to improve it without rethinking the contents.
27. Not sure
28. Have in-class discussions later from when topics were learned to allow students to digest rather than rushed into applying what they just learned.
29. -Lowering the exam grading percentage, because even if we put the effort on assignments and everything else the midterms and finals grades can make us not pass the class. -More on white board explanation of steps to a solution, I am a visual learner so I need to see where certain values come from, where are they going, what are they needed for, the break down of all the steps. I cant learn from slides, because I need to map myself in my brain what is on the slide with the words you say and that takes longer for me.
30. If the grading of exams is going to be harsh the exam should be adjusted. It could be open note like the other sections or curved. Also, posting all assignments on canvas ahead of time would be helpful.
31. Sometimes right after a homework assignment was due, a big chunk of the upcoming class was used to discuss the homework. I feel that some homework assignments were really simple and the amount of class time used to discuss them could be used to learn new concepts instead.
32. Overall a great class.

IASystem Course Summary Reports summarize student ratings of a particular course or combination of courses. They provide a rich perspective on student views by reporting responses in three ways: as frequency distributions, average ratings, and either comparative or adjusted ratings. Remember in interpreting results that it is important to keep in mind the number of students who evaluated the course relative to the total course enrollment as shown on the upper right-hand corner of the report.

Frequency distributions. The percentage of students who selected each response choice is displayed for each item. Percentages are based on the number of students who answered the respective item rather than the number of students who evaluated the course because individual item response is optional.

Median ratings. IASystem reports average ratings in the form of item medians. Although means are a more familiar type of average than medians, they are less accurate in summarizing student ratings. This is because ratings distributions tend to be strongly skewed. That is, most of the ratings are at the high end of the scale and trail off to the low end.

The median indicates the point on the rating scale at which half of the students selected higher ratings, and half selected lower. Medians are computed to one decimal place by interpolation.¹ In general, higher medians reflect more favorable ratings. To interpret median ratings, compare the value of each median to the respective response scale: *Very Poor, Poor, Fair, Good, Very Good, Excellent (0-5)*; *Never/None/Much Lower, About Half/Average, Always/Great/Much Higher (1-7)*; *Slight, Moderate, Considerable, Extensive (1-4)*.

Comparative ratings. IASystem provides a normative comparison for each item by reporting the decile rank of the item median. Decile ranks compare the median rating of a particular item to ratings of the same item over the previous two academic years in all classes at the institution and within the college, school, or division. Decile ranks are shown only for items with sufficient normative data.

Decile ranks range from 0 (lowest) to 9 (highest). For all items, higher medians yield higher decile ranks. The 0 decile rank indicates an item median in the lowest 10% of all scores. A decile rank of 1 indicates a median above the bottom 10% and below the top 80%. A decile rank of 9 indicates a median in the top 10% of all scores. Because average ratings tend to be high, a rating of "good" or "average" may have a low decile rank.

Adjusted ratings. Research has shown that student ratings may be somewhat influenced by factors such as class size, expected grade, and reason for enrollment. To correct for this, IASystem reports **adjusted medians** for summative items (items #1-4 and their combined global rating) based on regression analyses of ratings over the previous two academic years in all classes at the respective institution. If large classes at the institution tend to be rated lower than small classes, for example, the adjusted medians for large classes will be slightly higher than their unadjusted medians.

When adjusted ratings are displayed for summative items, **relative rank** is displayed for the more specific (formative) items. Rankings serve as a guide in directing instructional improvement efforts. The top ranked items (1, 2, 3, etc.) represent areas that are going well from a student perspective; whereas the bottom ranked items (18, 17, 16, etc.) represent areas in which the instructor may want to make changes. Relative ranks are computed by first standardizing each item (subtracting the overall institutional average from the item rating for the particular course, then dividing by the standard deviation of the ratings across all courses) and then ranking those standardized scores.

Challenge and Engagement Index (CEI). Several IASystem items ask students how academically challenging they found the course to be. IASystem calculates the average of these items and reports them as a single index. *The Challenge and Engagement Index (CEI)* correlates only modestly with the global rating (median of items 1-4).

Optional Items. Student responses to instructor-supplied items are summarized at the end of the evaluation report. Median responses should be interpreted in light of the specific item text and response scale used (response values 1-6 on paper evaluation forms).

¹ For the specific method, see, for example, Guilford, J.P. (1965). *Fundamental statistics in psychology and education*. New York: McGraw-Hill Book Company, pp. 49-53.