# Transcript: C960 Overview with Elnora Campbell and John Hoffman

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Speaker #1 (Narrator):

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Speaker #2 (Elnora Campbell):

Hello. Welcome to our podcast. We are going to be discussing best practices for Discrete Math 2 or C960 as we call it. I'm Elnora Campbell of program mentor in the computer science program and I have joining with me John Hoffman. He is a course instructor in our computer science bachelor's program as well. Welcome John.

Speaker #3 (John Hoffman):

Hey Elnora. Thanks. Great to be here.

Speaker #2 (Elnora Campbell):

Great. As I said, my name is Elnora Campbell. I've been a program mentor in the computer science bachelor's program for a little over two years now, excited to be working with one of our really great math course instructors; John. John, can you tell us a little bit about yourself, where you're from, how long you've been at WGU?

Speaker #3 (John Hoffman):

I'm from Northeast Ohio and I've been with WGU since 2017. Before coming to WGU, I used to teach math at a high school in Pittsburgh and in some different places they're. Outside of work, I really enjoy playing video games. I think a lot of time I play with my nephew a lot. I also play music, I play guitar. Always looking for good game recommendations or music recommendations, so if you have any feel free to have some time with me. I'd love to chat with you.

Speaker #2 (Elnora Campbell):

Awesome. Very interesting. Can you share your experiences with math outside of teaching at the high school?

Speaker #3 (John Hoffman):

Absolutely. I've liked math for a long time. I think I've always been a mathematician at heart, and one of the things that I really like about it is just how it lets us understand the world around us. I had a big interest in science and I moved into math when I got to college. Calculus in particular is one of my favorite subjects and one of the favorite courses that I took. When I took calc I started to see derivatives everywhere, derivatives being that rate of change. You just look around and everything changes, and so you start to see, "All right. These derivatives are popping up in all sorts of places," and I just really loved that. I wanted to learn more and see what else I could model, or understand, or try to put those things together. That's changed over the years. Even recently I was using one of the topics from our core site Bayes theorem to try to predict where I was going to finish in this battle royale video game. I was trying to see with the information I had with how many players were left, trying to predict where I would place it. It's something that I want to write up for the course too and ask me. I'd be happy to share the details of the equation of my assumptions. It was a fun little project there.

Speaker #2 (Elnora Campbell):

Awesome. You've already shared a little bit at least one of the things that the Discrete Math 2 course talks about Bayes Theorem. Can you tell us a little bit more about the course itself and what's covered in it?

Speaker #3 (John Hoffman):

The course has six main topics. It's algorithms, number theory, recursion, counting, probability, and modeling computation. The topics themselves are fairly disconnected. The one exception of that is the counting and probability. Counting is almost a prerequisite for probabilities, it going to go hand in hand. From my perspective, I think the course is a little bit more computational than Discrete Math 1. Questions themselves have a few more layers to them. There's a little bit more complexity in them and a lot of things coming together. As an example like in RSA, we use example like the modular arithmetic as a foundation for it. Euclidean algorithm is to compute encryption and decryption keys. They use fast modular exponentiation to encode and decode. Course like that unit builds on these concepts individually but they come together as somewhat of a complicated way; this encryption algorithm. It's also part of the fun with it too that have these layers and it's really interesting to dive into them and see how all these pieces fit together and that result that you get from working. It's definitely a lot of fun.

Speaker #2 (Elnora Campbell):

Thanks so much for sharing. I know with a lot of computer science students solving problems, putting puzzle pieces together is definitely something that they're interested in so awesome. Thank you for that. Now that we know a little bit about the course and what's covered in it, we know that it is an objective assessment course. Can you tell us maybe a little bit about that? How many questions has it timed?

Speaker #3 (John Hoffman):

The assessment arena has 55 questions and they're multiple choice. Time limit, there is150 minutes and so the two-and-a-half hours.

Speaker #2 (Elnora Campbell):

Are our students able to use formula sheets in this course as well?

Speaker #3 (John Hoffman):

There is a formula sheet and definitely calculator is going to be a huge boost for this one, but like I said, a lot of things are computational here and so definitely you want to calculate that you're comfortable with.

Speaker #2 (Elnora Campbell):

I know that calculus; obviously Discrete Math 1, are recommended prerequisites to be taken before or they take this course. Is there a particular reason why students are definitely encouraged to do that?

Speaker #3 (John Hoffman):

Discrete Math 1 I think has a lot of the foundational ideas, and logic, and proof, and just an introduction to discrete structures and discrete math in general. I also like calculus for this, it's not. Probably strictly required for the discrete sequence. I think that's it's helpful to have calculus because calculus just strengthens math skills in general. It's one of the gateways into some higher math too. There's theory and abstraction, there's pieces that mix with computation. It really helps to establish the structure of higher math courses. There's theorems with proof and then you do applications with those things. Their really good connector between some of the symbol manipulation you might do an algebra until more complex problem-solving, and calc discrete, and things that come after.

Speaker #2 (Elnora Campbell):

I know you've talked a little bit about this before, but can you tell us what excites you about this particular course?

Speaker #3 (John Hoffman):

I really love this course, I love the content in it. It's interesting, it's challenging, and I think that those things definitely make things more fun as you go through. It offers you a lot of those aha type moments like, "All right. I get this," and seeing these pieces coming together there. For me, I'm probably a little bit biased. I'm a number theorist and so the number theory section is my favorite, and then the course I love example isn't Euclidean algorithm. It's one of my favorite things to compute and the modular arithmetic stuff. The RSA piece that's one of my favorite modules and lessons in the course. I love working this problem.

Speaker #2 (Elnora Campbell):

Awesome. Just to reiterate because you mentioned this earlier, how would you relate this course to computer science in general? What would you say to an IT computer science student who is a little apprehensive about how this course and the others relate to a computer science degree?

Speaker #3 (John Hoffman):

Definitely an interesting question. I'm admittedly not a very strong programmer. In a very general and broad sense just studying discretes and math in general I think is just universally helpful in problem-solving. You need get those pieces that you've seen how they fit together and just general strategies. The tools and discreet are different, but the biggest common factor of course is that we do solve problems. Practicing all the skills in logic, reason, deduction, abstraction, generalization, in all things that go into both fields I think is one of the major benefits. You'll study in some math along with it. With those things in mind; the generalities, I think that there are specific topics that are also helpful in programming. In this particular course, we do runtime and algorithmic complexity. Some of the counting things there and there's the modular arithmetic and modularly common function and a lot of programming applications, and recursion counting, and probability. Anytime you have models that might have some randomness associated with them, understanding how those applications. Those concepts in general can be applied in many places. In my limited experience with programming, I definitely rely very heavily on my math background. It's a necessity for me because I'm much better at math than I'm at programming. The benefit of that is that in the things that I've done is I've found ways to reduce the complexity of some code or some things just by using some mathematical tools. There's things that I can reduce so to simpler questions where those math skills are coming in and I can take some of the lifting out of my programming and rely on my math skills there. Having that background lets me be a little bit more flexible and have some ability to re-factor or reduce complexity or approach solutions from different angles.

Speaker #2 (Elnora Campbell):

That is some really good stuff. Never really thought about the commonality but it makes so much sense, so good stuff. Let's keep it going. Can you talk to us a little bit about some of the common barriers that students may run into with this course?

Speaker #3 (John Hoffman):

Yeah, for sure. In some of the common questions that I view as students about it, it's definitely RSA sections and I think the RSA there like we mentioned it's just a complex thing and has a lot of layers to it. The RSA and so counting and probability are also some other sections. We get a lot of questions about RSA in particular. Please reach out to me. Like I said I love talking about number theory. I'm more than happy working on those things. I've got lots of great practice examples. On the counting probability side.

Speaker #2 (Elnora Campbell):

I think personally I find those sections challenging as well. It's one of those things that have never been that intuitive to me. I tell people all the time I'm not very good at counting. It's one of those things that's hard and their response is like, "But aren't you mathematician? Isn't that [inaudible 00:09:51]? Different, right?”

Speaker #3 (John Hoffman):

Well, you should see the [inaudible 00:09:54] you'll understand for sure, but there's just a lot of nuance there, and the details are so important in that section. It's like, does order matter, does it not matter? Then there's different techniques for approaching them and the questions themselves can be solved in many different ways and at times it's just different approaches or looking at it from the best angle to get the most direct solution. Again, it's one of those things that's also part of the fun, is that they do have those layers to them, and once you find maybe the solution you like or a different solution, it is very satisfying to see that all fall together.

Speaker #2 (Elnora Campbell):

Great. We've talked about some of the barriers that they see [inaudible 00:10:34], I'll remember to tell students you are the person to contact in reference to that. Now, with the berries in mind, what are some resources that are available to our students?

Speaker #3 (John Hoffman):

Of course shameless self-promotion here, the instructors are probably one of the best resources. They got to reach out. We could do our screen shares and work through questions and take notes just like other discussions on planning and pacing. We have alternate resources. We can talk about our own experiences learning a lot of those things. I mean, we all have different experiences learning it and some of us struggle in different areas and are more comfortable with different areas, and sometimes just getting those perspectives and picking people's brains can be really helpful just in how you approach math. I love connecting with students and share my story and my experiences. We have some supplemental worksheets for this course and those are fantastic. You can find them in the course tip section. There's a link there. They have examples from each module and they're really, really nice practice questions to supplement a lot of the content in the course, and their solutions, and all things, and so I always recommend those to students who are preparing for the assessment and preparing for the pre-assessment, doing some review. That extra practice I think is just generally helpful.

Speaker #2 (Elnora Campbell):

Definitely. I definitely agree. I love the plug. I cannot tell you or express to you how much myself and all the PMs in the computer science areas especially appreciate you-all and what you do. The students that I know that do utilize the resources that you mentioned, especially the live support, scheduling appointment with the course instructors, they usually are much more successful in the course, and they are always so appreciative. They always come back and tell me that they wish they had reached out earlier. I expressed that to my other students that they're there, they're waiting. Please call them, so great plug. Thank you so much. We talked about barriers, talked about the resources. What is the best route that you recommend for a student to go through the course most efficiently?

Speaker #3 (John Hoffman):

I think just to reiterate on that, I do hear that a lot from students as well like that, "I wish I would have called sooner. I was stuck on this for hours and now it makes so much sense just to see it worked out." I totally get that. Math, it's hard to read. I know even for me it can be hard to read and learn a new concept there. It's also hard to find good resources, especially for some of the content in this course because it is hard. It is challenging. I think that that's one of the things that we can definitely help with, is finding the resources as you're going through or alternatives, and doing some of that practice helping through.

Speaker #2 (Elnora Campbell):

Yes. I do find that with computer science students, they always want to do it on their own. I really, really try to express to them, yes, it's okay to figure out the puzzle, work the problems on your own, but sometimes we are stuck. Sometimes we do need help and the course instructors are always there. They're waiting, looking forward to speaking with you about math because math is their thing.

Speaker #3 (John Hoffman):

Absolutely. I can definitely relate to that. I'm very much like that myself. I do like to try to figure things out. One of the things that I think was hard for me in learning math is that it does take time to learn. It's one of those things that it's hard to read something and just immediately apply the idea, or immediately be able to use those ideas. It takes some time to internalize the concept and feel a little bit more natural, like muscle memory. Think about it. In my experience playing music, when I'm first learning a song, it takes a lot of mental energy to try to figure out where my fingers are going and how to do this, and I'm each time thinking about those changes. Then at some point I stop thinking about what my fingers are doing because they're just naturally going there, and I'm thinking about more structure. I'm thinking about bigger picture things. It's just like it happens naturally. I think my experience learning math was very similar. I didn't always see things the first time. It took me a couple of days to rest on those ideas and [inaudible 00:14:28] and internalize, and I'm a big believer in that. I know that it's something that has always worked for me. It's given my brain some time to rest, get a chance to build connection. I know for a lot of our students it's hard to hit the brakes sometimes. We've got that accelerate mentality, but I think with math it does help and it's okay, I think, to take an extra day to let some of those things settle up. There's been so many times that I've been stuck on something, stuck on something, and then looked at it the next morning and then all of a sudden all the things just fell into place. It all made sense just after a night of sleep.

Speaker #2 (Elnora Campbell):

Oh my goodness, that is so true, which is one of the reasons I do encourage my students if they're struggling with this course to use the resources, but also I encourage them to take breaks, maybe have a different course, more of a performance assessment type course that they're working with along with this course to break it up a little bit so they're resting because that's so true. You can sit something down, you're thinking about it racking your brain so hard, you set it down, come back to it and ta-da, it figures itself out.

Speaker #3 (John Hoffman):

Then like I said, I think that that's just great advice. I share that with students a lot too. It is good to tie some other things and just let your brain work on other stuff and then process the math in the background in the subconscious thing.

Speaker #2 (Elnora Campbell):

We've talked about the resources that are available expressly with the live sessions that you guys have. What can a student expect when they do book a live session or an appointment with the course instructor?

Speaker #3 (John Hoffman):

I mean, really we're happy to answer any questions you might have about the course. I mean, at times it looks like content and examples, work through some problems together, we can share work. That can be stuff from the course, from the pre-assessment, worksheets. Content calls I think are probably what most students think of when they think about talking with us, but really we do anything. I talk to students a lot who are like, "Well, I didn't want to book an appointment because I didn't know what to ask." That's fine, but we could just talk about the course in general. Some students are just like, "I don't know where to start or get moving on some of those things." We can give you some places to look or maybe some other ideas in terms of approaching when you're studying it and you connecting with all of our experiences and things there too. Things like that I think are great. I encourage students to schedule check-in appointments, just a time to check in every week whether you have content questions or not to see how things are coming along. Those things are good for, I'll share tips like, "Hey, here's a section you're going to be working on this week. Here's some key vocabulary. Make sure you can do these types of examples. If not, we'll talk about them next time." It can be really helpful. Again, just going back to that idea that it's hard to know what you might be missing out on. Like I said, we do all sorts of things, not just content, but all sorts of fun stuff.

Speaker #2 (Elnora Campbell):

Great. Awesome. Thank you so much John. I think that this session has been really informative, best practices for Discrete Math 2. We want to remember to reiterate to our students that plug about reaching out to their course instructors either via the live session or scheduling an appointment with them. All topics are available and open for discussion. We want to encourage students to definitely reach out to the course instructors all the time, but specifically with their math courses because it can save them time, stress, and energy. Thank you guys for joining us today and we look forward to the next one.

Speaker #1 (Narrator):

Schedule time with your instructor to explore more deeply. WGU, a new kind of you.