

Warning: This course is intense, even during a traditional 15-week semester. The summer course covers the same topics with the same amount of homework and exams, so it will be triply intense during this 5-week summer session. You should not plan to work full-time while taking this course, and you should not plan to go on vacation while the course is in session.

Some other things to consider as you decide whether to register for this class:

- There are specific technical requirements for this course. See the section on Computer Software below.
- You are required to take the exams for this course in a proctored environment. See the section on Exams below.

Instructor: Dr. Barbara D'Ambrosia

Office: Dolan E217

Phone: (216) 397-4682

E-mail: bdambrosia@jcu.edu

Web page: www.jcu.edu/math/faculty/bdambros/

class materials at <http://blackboard.jcu.edu/> (Note: This URL is subject to change.)

Course dates: June 16 – July 17

Office hours*:

Monday	Tuesday	Wednesday	Thursday
10:00 – 12:00 1:30 – 3:30	10:00 – 12:00 1:30 – 3:30	10:00 – 12:00 1:30 – 3:30	10:00 – 12:00 1:30 – 3:30

*These are times when I will generally be in or near my office and responding to phone and e-mail. If there are students physically present in my office, or if I have stepped out for a few minutes, I will not answer the telephone – but if you leave a message and a callback number, I will return your call as soon as possible. Similarly, I will respond to e-mail promptly. In the evenings and on Friday-Sunday, I will generally check e-mail frequently and respond as quickly as I can. If you live reasonably near campus, your interactions with me will be most beneficial if you come to my office so that we can have a face-to-face interaction. Past experience has shown, though, that telephone conversations are reasonably effective.

Content and purpose: This course is an introduction to mathematical logic and proof, in the setting of discrete mathematics. You will learn to read and write mathematical proofs of results about sets, functions, relations, and fundamental properties of the integers. You will also learn about basic counting techniques and graphs, as well as matrix operations.

Text: There is no required textbook for this course. If you want a written reference, most sophomore level discrete math or “introduction to higher mathematics” texts should be appropriate.

Computer Software: You must have access to the internet with the ability to play MP4 video files. (Most browsers and mobile devices support this file type.) You must also have Microsoft Word and MathType (available for PC or Mac). It’s possible to use MathType with a word processing program other than Microsoft Word, but you will most likely find it very cumbersome. You should purchase MathType directly from Design Science, at <http://www.dessci.com/en/>. The academic price is roughly \$57. Be sure to get the correct version for your computer (Windows or Macintosh). You should install and test this software before the first day of class. Approximately one week before the beginning of the course, I will post an instructional video and a sample assignment so that you can practice with MathType and make sure it works on your computer before you must use it for homework.

Instructional Method: Instruction in this course will be in the form of screen recordings (videos). JCU summer classes meet on Monday-Thursday, and I have organized the course along those lines. Each Friday I will post the videos for the coming week, indicating which videos correspond to which day of that week. Total playing time for each day will vary, but will not exceed 1.5 hours. Because I expect you to pause the videos to work examples or catch up on writing notes, this corresponds on average to roughly 2.5 fifty-minute class periods in a face-to-face class. In addition to e-mail and the telephone, students can use the Discussion Board in Blackboard to interact with each other and me throughout the course.

Exams: You will take three midterm exams and a comprehensive final exam. *You must take the exams in a proctored environment* through an approved higher education institution. (A public library is not an approved exam location.) Many community colleges and branches of large universities provide this service; you are responsible for any fees associated with taking exams. You must bring an official form of identification with you to each exam. Calculators are not permitted during exams.

- If you reside within a reasonable distance of JCU (roughly 40 miles), you must take your exams at JCU, where they will be proctored by me at no additional charge.
- If you reside further away, you must make arrangements for a proctored exam, and submit a **proctor approval form** to me at least one week in advance of the exam. This form will be available with the other course materials at least one week before the beginning of the course.
- You may also opt to take some or all of the exams at JCU when fall courses resume in September, on a date or dates to be negotiated between us.

Quizzes: In conjunction with each of the midterm exams, you will take a quiz on definitions and theorem statements. The procedures for quizzes are identical to those for exams. You must take each quiz on the same day that you take the corresponding midterm exam.

Homework: You will receive a homework assignment to go along with each section of class notes. *There will be homework due every day of class, except on the first and last days.* Most students find that the homework in this course takes about two hours for every 50-minute class period. So you should plan on 4-6 hours of homework each class day, in addition to the 2+ hours of watching videos. I will grade your work for clarity and mathematical correctness, holding you to high standards of mathematical exposition. I will do my best to always return homework within 24 hours of the due date. You will receive more information on submission procedures in a separate document on the first day of class. Homework problems fall into two categories:

- *Peer Reviewed* homework consists of theoretical questions which are usually proofs or counterexamples. Students will take turns submitting solutions and reviews of these solutions. The solutions and reviews will be posted on Blackboard, along with my comments. I expect every student to attempt to solve every problem, regardless of whether s/he is the official solver for that problem. After reading the posted solutions and comments for a problem, every student will do an analysis of the errors, if any, in that problem. You will always have at least 24 hours to complete an initial solution or a review, and you will always type these using MS Word and MathType. Because other students depend on your solutions and reviews in order to do their work, late penalties for peer reviewed homework are severe. Because of the peer review process, different people will have different due dates for the same problem. Use the calendar feature of your phone or Google or Blackboard to keep track of your personal due dates.
- *Written* homework consists of problems that everyone does and submits. I encourage you to converse with your classmates in devising strategies for solving these problems, but I expect that you will write your solutions independently of any other person. In most cases, you will type your solutions using MS Word and MathType, but there are a few instances when I will ask you to scan or photograph your written work instead. You will frequently have multiple assignments due on the same class day.

Writing standards: In the section describing liberal education at John Carroll University, the Undergraduate Bulletin states: “Fluency in written expression is essential to a liberal education. The University expects students at all times to maintain acceptable standards of written English. Failure to maintain these standards in any class work may result in the lowering of the final course grade.” The work that you submit in this course serves to demonstrate both your mastery of concepts and your ability to communicate those concepts in the language of mathematics. For this reason, I will grade your work for mathematical correctness as well as for clarity of presentation.

Late Policies: You may turn in up to three late written homework assignments, provided you discuss the situation with me in advance of the due date and time. Multiple late assignments that are due on the same day count as separate late assignments. There is a 40% penalty for peer reviewed homework that is up to one hour late, and a 60% penalty for peer reviewed homework that is between one and two hours late. Peer reviewed homework that is submitted more than two hours late will receive not credit.

Grading: Point values for written homework problems vary. Initial solutions of peer reviewed problems are worth 10 points, reviews and subsequent solutions are worth 5 points, and analysis of each peer reviewed problem is worth 2 points. Each quiz will be worth 50 points, the midterm exams will be worth 100 points each, and the final exam will be worth 200 points.

Points in different categories carry different weights. Your course grade will be based on the following.

Peer Reviewed Homework	Written Homework	Quizzes	Midterm Exams	Final Exam
10%	15%	9%	45%	21%

The scale for determining course grades is 90-100 (A-/A), 80-89 (B-/B/B+), 70-79 (C-/C/C+), 60-69 (D/D+), with plus and minus grades being assigned at my discretion in borderline cases. There are a few exceptions:

- I will reduce by one letter the grade of any student who does not submit at least 80% of the assigned peer reviewed homework and at least 80% of the assigned written homework.
- I reserve the right to assign a grade of *F* to any student who does not pass the final exam.

Getting help: Your best bet for getting help when you have questions about material in this class is to contact me. I encourage you to come see me in person when possible.

Academic honesty: The work you turn in to me must be your own. I encourage you to work with others on homework, but you should write up solutions to problems yourself, without copying from another person's work. If you turn in work that has clearly been copied from or written by another person, I will assign a score of 0 for that assignment. Repeated instances of copying homework problems may result in a score of 0 for all future assignments in the course. Cheating in any form on an exam or quiz (e.g., copying from another student, accessing unauthorized books, notes, or electronic devices, or engaging in any other behavior which is intended to misrepresent your knowledge of the exam material) will cause you to earn a score of 0 on that exam. A second instance of cheating on an exam or quiz will result in your receiving a grade of *F* in the course. In accordance with University policy, I will send a written report of any incident of cheating on an exam or quiz to the dean of the College of Arts and Sciences. She will provide you with a copy of my report, and will keep a written record of the complaint in your file. The dean will review the case and determine if, in light of other information and records, further disciplinary action is warranted. See the Undergraduate Bulletin for procedures for appealing charges of academic dishonesty.

Treating others with respect: At John Carroll University, we are committed to fostering a respectful and inclusive campus community. Incidents of bias which are intentional or unintentional actions against someone on the basis of an actual or perceived aspect of their identity, including actions that occur in the context of a class, can and should be reported on the Bias Incident Reporting Form, accessible at <http://sites.jcu.edu/bias/>. If you notice bias in

connection with this class, I hope you will also discuss the incident(s) with me. Questions about bias can be directed to members of the Bias Response Team: Lauren Bowen, Associate Academic Vice President (bowen@jcu.edu), Bud Stuppy, Director of Human Resources (cstuppy@jcu.edu) or Danielle Carter, Director of the Center for Student Diversity and Inclusion (dcarter@jcu.edu).

Students with disabilities: In accordance with federal law, if you have a documented disability (Learning, Psychological, Sensory, Physical, or Medical) you may be eligible to request accommodations from the Office of Services for Students with Disabilities (SSD). Please contact the Director, Allison West at (216) 397-4967 or go to the office located in room 7A, in the Garden Level of the Administration Building. After your eligibility for accommodations is determined, you will be given a letter which, when presented to me, will help me know best how to assist you. Please keep in mind that accommodations are not retroactive so it is best to register before the beginning of the course. Only accommodations approved by SSD will be recognized in the course. Please contact SSD if you have further questions.

Important Dates: I will require that all students take each exam at the same time. Once I know who's in the class, and particularly the students' time zones, the students and I will work together to agree upon times for exams. The default time is 8:00 a.m. – 10:00 a.m. EDT.

June 24Quiz 1, Exam 1.
 July 2Quiz 2, Exam 2.
 July 14Quiz 3, Exam 3.
 July 17Final Exam.

Schedule of Topics:

Week 1	Divisibility, Logic, Division Algorithm, Euclidean Algorithm, Fundamental Theorem of Arithmetic
Week 2	Sets, Induction, Pigeonhole Principle, Counting Techniques, Relations
Week 3	Equivalence Relations, Partitions, Modular Arithmetic, Functions
Week 4	Inverse Functions, Graphs, Matrix Algebra
Week 5	Matrix Algebra, Course Review