Syllabus - Math 17 Winter 2023

The abc Conjecture

1 Course Catalogue Description

Gives prospective Mathematics majors an early opportunity to delve into topics outside the standard calculus sequence. Specific topics will vary from term to term, according to the interests and expertise of the instructor. Designed to be accessible to bright and curious students who have mastered BC Calculus, or its equivalent. This course counts toward the Mathematics major, and is open to all students, but enrollment may be limited, with preference given to first-year students.

2 Course Topic

The abc conjecture states that if $a$, $b$, and $c$ are relatively prime integers satisfying $a + b = c$, then $a$, $b$, $c$ cannot all have many repeated prime factors. In this course, we will make this conjecture precise, consider polynomial analogues, and discuss the controversy surrounding the announced proof of the conjecture by Shinichi Mochizuki.

3 Textbooks


4 Instructor

Instructor: Juanita Duque-Rosero
Office: 243 Kemeny Hall
E-mail: juanita.gr@dartmouth.edu

5 Lectures

Lectures: Tuesday, Thursday, block 10A (10:10 a.m. - 12:00 p.m.)
x-period: Friday, block 10AX (3:30 - 4:20 p.m.)

6 Learning Outcomes

By the end of this course, you should be able to:

1. Understand some basic structures of algebra and number theory: define terms, explain their significance, and apply them in context;
2. Solve mathematical problems: utilize abstraction and think creatively; and

3. Discover mathematical patterns and then recognize and construct mathematically rigorous arguments.

7  Grading

The course grade will be based upon the scores on class participation, homework, and a final project as follows:

- Class participation: 30%
- Written homework: 30%
- Final project: 40%

The lowest homework score will be dropped. This grading policy is subject to change, but grades will not decrease as a result of changes.

8  The Honor Principle

Academic integrity is at the core of our mission as mathematicians and educators, and we take it very seriously. We also believe in working and learning together. Collaboration on homework is permitted and encouraged, but obviously it is a violation of the honor code for someone to provide the answers for you. On written homework, you are encouraged to work together, and you may get help from others, but you must write up the answers yourself. If you are part of a group of students that produces an answer to a problem, you cannot then copy that group answer. You must write up the answer individually, in your own words.

9  Attendance

You are expected to attend class in person unless you have made alternative arrangements due to illness, medical reasons, or the need to isolate due to COVID-19. For the health and safety of our class community, please: do not attend class when you are sick, nor when you have been instructed by Student Health Services to stay home. Please arrange with your professor how to catch up on any course material that you miss.

10  Safety

In accordance with current College policy, all members of the Dartmouth community are required to wear a suitable face covering when indoors, regardless of vaccination status. This includes our classroom and other course-related locations, such as labs, studios, and office hours. If you need to take a quick drink during class, please dip your mask briefly for each sip. Eating is never permitted
in the classroom. (The only exception to the mask requirement is for students with an approved
disability-related accommodation; see below.) If you do not have an accommodation and refuse to
comply with masking or other safety protocols, I am obligated to assure that the Covid health and
safety standards are followed, and you will be asked to leave the classroom. You remain subject
to course attendance policies, and dismissal from class will result in an unexcused absence. If you
refuse to comply with masking or other safety protocols, and to ensure the health and safety of
our community, I am obligated to report you to the Dean’s office for disciplinary action under the
Guarini School’s Standards of Conduct. Additional COVID-19 protocols may emerge. Pay attention
to emails from the senior administrators at the College.

11 Accommodations

Students requesting disability-related accommodations and services for this course are required to
register with Student Accessibility Services (SAS; Getting Started with SAS webpage;
student.accessibility.services@dartmouth.edu; 1-603-646-9900) and to request that an accommodation
email be sent to me in advance of the need for an accommodation. Then, students should schedule a
follow-up meeting with me to determine relevant details such as what role SAS or its Testing Center
may play in accommodation implementation. This process works best for everyone when completed
as early in the quarter as possible. If students have questions about whether they are eligible for
accommodations or have concerns about the implementation of their accommodations, they should
contact the SAS office. All inquiries and discussions will remain confidential.

12 Special Considerations

The academic environment at Dartmouth is challenging, our terms are intensive, and classes are
not the only demanding part of your life. There are a number of resources available to you on
campus to support your wellness, including your undergraduate dean (http://www.dartmouth.edu/~upperde/), Counseling and Human Development (http://www.dartmouth.edu/~chd/), and the
Student Wellness Center (http://www.dartmouth.edu/~healthed/).

Some students may wish to take part in religious observances that occur during this academic term. If
you have a religious observance that conflicts with your participation in the course, please meet with
your instructor before the end of the second week of the term to discuss appropriate accommodations.

13 Title IX

At Dartmouth, we value integrity, responsibility, and respect for the rights and interests of others,
all central to our Principles of Community. We are dedicated to establishing and maintaining a safe
and inclusive campus where all have equal access to the educational and employment opportunities
Dartmouth offers. We strive to promote an environment of sexual respect, safety, and well-being. In
its policies and standards, Dartmouth demonstrates unequivocally that sexual assault, gender-based
harassment, domestic violence, dating violence, and stalking are not tolerated in our community.
The Sexual Respect Website (https://sexual-respect.dartmouth.edu) at Dartmouth provides a
wealth of information on your rights with regard to sexual respect and resources that are available
to all in our community.

Please note that, as a faculty member, I am obligated to share disclosures regarding conduct under Title IX with Dartmouth’s Title IX Coordinator. Confidential resources are also available, and include licensed medical or counseling professionals (e.g., a licensed psychologist), staff members of organizations recognized as rape crisis centers under state law (such as WISE), and ordained clergy (see https://dartgo.org/titleix_resources).

Should you have any questions, please feel free to contact Dartmouth’s Title IX Coordinator. Their contact information can be found on the sexual respect website at: https://sexual-respect.dartmouth.edu.