2020

Math 220P Foundations of Mathematics

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Course Syllabus

MATH 220P: Discrete Mathematics (Introduction to Proofs)

Instructor	Nicholas Vlamis	**Office**	507 Kiely Hall
E-mail	nicholas.vlamis@qc.cuny.edu	**Office Hours**	MW 11am-12pm
Class	M 3:10–4:25pm, 414 Kiely Hall		W 4:30-5:30pm
Website	http://220p.nickvlamis.com		or by appointment

Course Description

The goal of the course is to provide an introduction to higher-level mathematics and bridge the gap between the skills used in calculus and those in higher-level courses (for instance, algebra, analysis, topology). Mathematicians have a specialized language and method for communicating mathematical ideas and theory. In this course, you will learn to think, communicate, and write as mathematicians! In particular, you will learn how to write mathematical proofs.

The proof writing techniques to be discussed include: conditional, biconditional, contradiction, induction, set-theoretic, and existence and uniqueness proofs. Topics of mathematical content include: mathematical logic, sets, relations, functions, number systems, and countability.

A note on the P: This course is MATH 220P, a variation of the standard MATH 220: Discrete Mathematics course. Though we will have some overlap in content, the focus of this course is significantly different from the standard 220 and you should not expect the course to have much in common with the other sections of 220. However, this course fulfills all the same academic requirements as MATH 220. Additionally, if you have already taken MATH 120, then this course cannot be counted as credit towards your degree.

Prerequisites

The only official prerequisite is one semester of calculus with a C- or better. The goal of this prerequisite is only to make sure you have had experience in a college-level math course: calculus will not be used in this course. With that said, to succeed in the course, you need to be open to being interested in mathematics—if you are not already—and a willingness to think in new and creative ways.

Supplies

The text for this course is *Mathematical Reasoning: Writing and Proof*, Verision 2.1, written by Ted Sundstrom. This textbook is available online as a PDF at no cost (or, if you prefer, you can buy a printed copy on Amazon for $22). The textbook can be found on the course website; additional information about the book can be found Sundstrom's website.

The plan is to cover the first seven chapters of the text. Roughly, each day of class will cover one section of a chapter.

Course Website

The course website is http://220p.nickvlamis.com. The website will contain all the course materials, schedules, and announcements. You should plan on regularly checking this site.

Assessment

Your course grade will be determined from the following categories and weights:

Participation	10%
Proof Portfolio	30%
Exams	60%

Participation: Your participation grade will consist of two equally-weighted parts: daily preps and in-class activities.

- **Daily Preps:** On days we meet, you will have a preparatory assignment to complete consisting of readings in our text, completing activities from the text, answering some reading questions, and/or watching short video(s). Each of these daily prep assignments will be graded on a scale of 5 points and marked primarily on effort and completeness. See the separate document on daily prep assignments for full details. Your two lowest daily prep grades will be dropped.
- **In-Class Activiities:** We will frequently engage in small group activities in class where you explore ideas, investigate conjectures, solve problems, and write proofs. This work won't be collected, but you will be expected to engage with your group and share your findings with the class.

Proof Portfolio: Over the course of the semester you will develop a portfolio with proofs or disproofs of 10 conjectures demonstrating important writing, reasoning, and mathematical techniques. These 10 problems will be critiqued by me in draft form prior to final submission for rewriting. See the separate document on Proof Portfolios for full details.

Exams: We will have three equally-weighted exams (each exam is worth 20% of your overall grade). Exams 1 and 2 will be held in class and Exam 3 will given during the assigned final exam time given by the registrar. Exam 3 will *not* be cumulative. **All exam questions will come directly from the Sundstrom text.** The exams are scheduled for the following dates:

Exam 1:	Wednesday, March 4 (in class)
Exam 2:	Tuesday, April 7 (in class)
Exam 3:	Monday, May 18, 1:45–3:45pm (Room TBD)

Expectations

Attendance: Attendance is required: you are expected to be present and on time each day. This is essential not only for your success in the course, but also that of your peers as large portions of the course will be dedicated to working in groups. If you miss a class, you are responsible for everything and anything that happened in class: you should check the course website and talk to a classmate. Outside of extenuating circumstances, missing more than two classes will negatively affect your participation grade.

Preparation: It is imperative that you work on a consistent basis. This applies both to the day-to-day work to prepare for class, as well as to more long term studying and writing on items like the portfolio project. You should expect to spend an average of 10 hours each week outside of class on these tasks. You should also keep a well-organized record of all your study notes and completed problems for future reference. Please understand that a great deal of your learning in this course must occur on your own: it is your responsibility to read the text, do the problems, work on the portfolio, and seek help as needed. The main goal of this class is to learn a particular mathematical skill—writing proofs—that can only be accomplished by practice.

Office Hours: I welcome and encourage students to come to my office hours alone or in small groups with prep assignments, in-class content, or portfolios questions. You can ask me anything you like, but please come to my office prepared.

Academic Honesty: While you are strongly encouraged to work together in class, it is essential that the work you submit for your Proof Portfolio be your own, see the separate sheet on Proof Portfolios for a full explanation of what this means. Evidence of plagiarism in an assignment will result in a grade of zero and possible action under the guidelines of Queens College Academic Integrity Policy. You are expected to show integrity in all your work, and to encourage your peers to do likewise. I reserve the right to discuss the nature of your work with you prior to assigning a grade on an assignment. **Note**: *the proof portfolio is a completely independent exercise; no collaboration or use of external sources is permitted on it. In addition, throughout the course, you may not use the internet to find hints or solutions to exercises or portfolio problems.*

Using electronic tools in class: While you may use mobile devices (tablets or laptops) for reading and writing purposes related to Math 220P, I respectfully ask that you not use phones, laptops, or other electronic devices in class for any other purposes.

Makeup exams/assignments: There will be no makeup exams. If you miss an exam for a certifiable reason, other arrangements will be made. If you have significant extenuating circumstances that are making it difficult or impossible to meet key deadlines, please see me to discuss the situation and make possible arrangements.

Collegiate Spelling, Grammar, and Punctuation: Writing is a major component of this course. Everyone is expected to write at a collegiate level. This includes, but is not limited to, the use of correct spelling, punctuation, and grammar. On any test or assignment, excessive errors in this regard will result in appropriate deductions from your work. Papers not of collegiate quality in this regard may be returned unmarked.

Participation: In every class meeting, there will be significant opportunities for you to actively participate. Through questions asked in all-class discussion, exercises individually or for teams of 2-3, discussion of homework problems, and more, you will be able to check and demonstrate your understanding in class. You must be up to date and prepared for class to participate effectively. I expect that everyone will share in this important aspect of our learning process.

Student Concerns: Any student with a disability or other special circumstances should make an appointment and discuss this with me. Students with disabilities needing academic accommodation should register with and provide documentation to the Office of Special Services, Frese Hall, room 111. The Office of Special Services will provide a letter for you to bring to your instructor indicating the need for accommodation and the nature of it. This should be done during the first week of class. For more information about services available to Queens College students, contact the Office of Special Services (718-997-5870) or visit their website (http://sl.qc.cuny.edu/oss/). If you need special accommodation for an assessment, contact me at least one week beforehand.