Comments on this course.

Together with Math 310, this course forms "basic training" for mathematics majors. These intermediate level courses serve as bridges from the basic mathematics you have seen in high school and in calculus to the more advanced mathematics courses you will take later. One of the major goals of Math 310-320 is to build your skill in understanding mathematical theorems and developing and writing their proofs.

Many Mathematics majors find these courses to be among the most challenging they take because the way of thinking may seem at first unfamiliar:

- Computation will not be the focus; most problems will not have a number or formula as an answer.
- You can't master this material by memorizing rote procedures.
- Plausible reasons for expecting something is true, while to be desired, will not usually suffice. Proof will ultimately be required.

We will learn to understand mathematical theorems by:

- Analyzing important examples to determine why the theorem should be true, and then
- Developing the complete logical argument that establishes the truth of the theorem, starting from a clearly stated set of assumptions and using results established previously.

To succeed in this course you will have to train yourself to think about the logical structure of the subject matter and understand the definitions of concepts and the statements and proofs of theorems. You will need to understand a collection of key examples and be able to reason about their properties. You will need to document much more of your thinking about problems than you probably have done before. While a good intuition is necessary to guide you to correct statements, just making correct statements alone will not be enough. You must be able to prove them.

Why do you have to master this way of thinking in order to continue in mathematics? The answer is that this abstract" proof-oriented work is the way all mathematics is communicated. On a deeper level, it is what mathematics-both pure and applied-is really about. The distinctive feature of our branch of knowledge, the concept of mathematical proof, is one of the crowning achievements of the human intellect.

Lest this sound daunting, be aware that you will have lots of chances to develop and practice these new skills, and I will always be willing to help you over the rough spots. Moreover, you will find our textbook to be an excellent resource, especially for the motivation behind the topics we study. Even if you find this course difficult at first, persistence and openness to a different way of thinking should eventually pay off.

*Adapted from John B. Little, Holy Cross University.