

“Mathematics is not a deductive science – that’s a cliché. When you try to prove a theorem, you don’t just list the hypotheses, and then start to reason. What you do is trial and error, experimentation, guesswork.” - Paul Halmos, *I Want to be a Mathematician*

Logic and Foundations of Mathematics

Math 509-WWP Spring 2018

Instructor: Dr. Heather Gamel
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Phone: 985-448-4380

On Campus Office Hours: MW 10:45-12:45 and 1:30-3:30, TTh 12-1, and by appt. Please note that you can reach me by phone during my office hours and by email during most of the day. I will try to get to your emails in a timely fashion, but note that I typically am not available in the late evening. I will reply to emails within 48 hours (not including Sunday). You are always welcome to make an appointment to speak to me by phone outside of my regular office hours.

General Math Department Information

Location: Peltier 108

Phone: 985-448-4381

Fax: 985-448-4374

Required Text: *A Transition to Advanced Mathematics*, 8th ed., by Smith, Eggen, and St. Andre.

Recommended Text: *Book of Proof* by Richard Hammack. A free pdf version of this book is available at www.people.vcu.edu/~rhammack/BookOfProof/ and you can purchase the book from Amazon. www.amazon.com/Book-Proof-Richard-Hammack/dp/0989472108

Prerequisites: MATH 265 (Calculus III) and MATH 358 (Foundations of Mathematics).

Catalog Description: *MATH 509* Cornerstone course normally taken in first semester of graduate study. Developing and evaluating arguments and proofs, the use of various types of reasoning, methods of proof, making and investigating conjectures.

Course Purpose: This course is designed to prepare you for all of your future math content courses. You will become comfortable with mathematical language and logic, designing and evaluating proofs, and creating proofs for common mathematical objects.

Course Learning Objectives: Student will be able to

- Apply standard mathematical language;
- Formulate definitions of given mathematical terms;
- Form conjectures;
- Discuss the plausibility of a conjecture without a formal proof;
- Use counterexamples to disprove false conjectures;

- Apply set theory;
- Prove theorems involving set theory;
- Develop assertions as theorems;
- Use propositional logic to construct a proof;
- Apply rules of inference following a logical sequence of steps to prove a statement or statements written in symbolic form.
- Use assumptions, axioms, previously proved theorems and definitions in proofs.
- Apply various methods of proof including direct proof, proof by contrapositive, proof by contradiction, and different forms of mathematical induction.
- Utilize tautologies to simplify complicated statements and then write a formal proof.

Minimal Technical Skills, Hardware and Software Requirements:

Access to a computer with internet is required. The majority of the information needed to take this course will be posted on Moodle, the learning management system (LMS) used by Nicholls. Students must have access to Moodle, their Nicholls email, a program that reads pdf files, and a program that reads Microsoft word files.

Assignments will be turned-in online in pdf form, so you either need to be able to type up your assignments (via a LaTeX interface or a word processor such as Microsoft Word and then convert to a pdf) or you need access to a scanner to upload hand-written assignments. Scanned assignments must be saved and uploaded to Moodle as one document. Please be sure all scanned assignments are clear and legible. If I can't read it, I can't grade it. Students that live close to campus, may turn physical assignments in to my mailbox (Peltier 108).

If you are interested in learning to use LaTeX (typing program used by most mathematicians) see the LaTeX folder in the Resources section of the course page on Moodle. Example LaTeX codes will be placed on Moodle throughout the semester.

Links to important websites and/or tutorials:

The URL for the University's distance learning website is www.nicholls.edu/distance/. FAQs about internet courses can be viewed at the website www.nicholls.edu/distance/faqs. A Moodle Tutorial can be viewed at the website www.nicholls.edu/distance/moodle-tutorial/.

Course Requirements, Course Content, and Methods of Evaluation

Grade Break-Down:

Homework	40%
Discussion Forums	5%
Mid-Term	25%
Final Exam	30%

Grading Scale:

A	90-100
B	80-89.9
C	70-79.9
D	60-69.9
F	0-59.9

Assignments: Assignments will be posted on Moodle. Depending on the length of the assignment, you will have one to two weeks to complete it. The assignment will consist of non-graded reading, non-graded homework questions, graded homework questions, and sometimes a graded discussion forum. In order to succeed in this course, you should do the whole assignment and not just the graded aspects.

Homework: Graded homework should be turned in through Moodle in pdf form or placed in my campus mailbox before the due date. Your homework will be returned as quickly as I can, but due to the nature of this class, it will not be instant turn-around.

Discussion Forums: When grading discussion forums, I am looking for your thought process. Simple posts like “me too” do not count. Details will vary for each forum, so read the instructions carefully for each one. In general, make sure your posts are polite. A quick internet search for “discussion forum etiquette” will give you lots of good resources. If you are unsure if something is appropriate, it probably isn’t.

Mid-Term and Final: You will have two proctored tests for this course. You can either take the tests on campus or fill out a distance testing form and take the tests under an approved proctor. The dates for the tests are

	On-Campus	Distance Testing
Mid-Term	March 12 at 1 pm	March 12 or March 13
Final Exam	May 10 at 1 pm	May 10 or May 11

Proctor Requirements for Distance Learners: Distance learners are those students who will take tests off-campus because they do not live in driving distance of Nicholls campus. Distance learners must locate an approved testing facility near their home. A list of approved testing centers is given on the Proctor Approval Form. If you will be taking tests off-campus you must inform me via email, and complete the Proctor Approval form. The completed Proctor Approval form must be uploaded using the link provided on the Moodle course homepage by **February 15**.

Once I have approved your proctor, you must schedule the test with your proctor at least two weeks before you will be taking the test. I will send a Test Administration Procedure Form to the approved testing center or proctor approximately one week before the scheduled exam date. The test administrator will be required to complete the Test Administration Form and return it to me before the day of the test. Be sure you leave yourself plenty of time to meet all of these deadlines!

Class Policies and Procedures

Attendance: Participation in activities is required where an electronic record which clearly indicates time and date activity was submitted. For financial aid purposes, student must complete at least one activity, which is equivalent to having attended at least one class.

Make-Up Policy: In general, late assignments will not be accepted. If life explodes and you need an extension, you must let me know prior to the assignment due date. Once the solution is posted, you cannot turn in the assignment.

Tests must be taken during their scheduled dates. If you have a conflict that absolutely cannot be moved, let me know at least two weeks in advance. In case of extreme emergency, contact me as soon as you know you will miss the test.

Academic Grievances: The proper procedure for filing grade appeals or grievances related to academic matters is listed in Section 5 of the Code of Student Conduct at the following link: <https://www.nicholls.edu/sja/files/2015/06/Code-of-Student-Conduct-Handbook.pdf>.

Academic Honesty Policy: Disciplinary action for academic dishonesty will be handled according to the Code of Student Conduct. You may find a copy at the following Internet website: www.nicholls.edu/sja/files/2015/06/Code-of-Student-Conduct-Handbook.pdf

Drop Date: Final date for automatic *W* when dropping a course or resigning from the university is March 28, 2018.

Assistance with Studying and Assignments:

- **The Tutoring Center** at 143 Peltier Hall. Call 985-448-4100, email tutoring@nicholls.edu, or visit www.nicholls.edu/tutoring
- **The Writing Center** at 144 Peltier Hall. Call 985-448-4100, email tutoring@nicholls.edu, or visit www.nicholls.edu/tutoring
- **Online Tutoring through Moodle.** Look for Brainfuse log-in link on the Moodle home page.

Americans with Disabilities Act (ADA): Students with a documented disability are entitled to classroom accommodations under the ADA. To receive accommodations, contact the Student Access Center at (985)448-4430 (TTY 449-7002) or 158-A Shaver Gym. Additional information can be found at www.nicholls.edu/disability.

Moodle is designed to meet a variety of world accessibility requirements, including Section 508, Section 504 and W3C. Moodle supports the use of assistive technologies such as screen readers, text magnifiers and speech-to-text solutions. Additionally, all functionality in Moodle is designed to be keyboard accessible.

Continued Learning following an Extreme Emergency: In order to make continued learning possible following an extreme emergency, Students are responsible for:

- reading regular emergency notifications on the NSU website;
- knowing how to use and access Moodle;
- being familiar with emergency guidelines;
- evacuating textbooks and other course materials;

- knowing his/her Moodle student login and password;
- contacting faculty regarding their intentions for completing the course.

Faculty are responsible for:

- their development in the use of the Moodle software;
- having a plan for continuing their courses using only Moodle and email;
- continuing their course in whatever way suits the completion of the course best, and being creative in the continuation of these courses;
- making adjustments or compensations to a student's progress in special programs with labs, clinical sequences or the like, only in the immediate semester following the emergency.