MTH 300.500 – Spring 2018
Foundations of Mathematics

Course Description
Set theory, relations, functions, mathematical structure, logic, and proof. Includes historical connections. A more detailed course description is available online.

Course Prerequisites
MTH 129 and MTH 138

Course Time and Meeting Place
Online at http://d2l.sfasu.edu, January 16 – May 11

Instructor
- Dr. Jane H. Long, Associate Professor, Department of Mathematics and Statistics
- Office: Math 318
- TEL: (936) 468-1804
- Email: longjh@sfasu.edu

Office Hours:

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>Monday</td>
<td>11:00AM – 12:00PM; 3:30-4:30PM if no colloquium</td>
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<tr>
<td>Wednesday</td>
<td>11:00AM – 12:00PM</td>
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<td>Friday</td>
<td>11:00AM – 12:00PM; 2:00-3:00PM</td>
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Additional office hours by appointment. The instructor regularly takes appointments. Do not hesitate to request one.

Course Goals
- To learn to give precise, logical mathematical arguments (proofs) justifying mathematical statements
- To develop abstract thinking skills
- To learn to communicate mathematical ideas precisely
- To connect the importance of precision in mathematical arguments to the practice of classroom teaching

Learning Objectives
At the end of MTH 300, a student who has studied and learned the material should be able to:

1. Develop appropriate mathematical vocabulary.
2. Demonstrate a basic understanding of logic and valid reasoning.
3. Demonstrate an understanding of applications of logic to geometry.
4. Apply principles of inductive reasoning to make conjectures and use deductive measures to evaluate the validity of conjectures.
5. Communicate effectively about mathematics, with an ability to convey detailed information with clarity and accuracy, and to construct well-reasoned explanations.
6. Demonstrate strategies for proof and utilize counterexamples efficiently.
7. Demonstrate an understanding of applications of logic and proof to relations and functions.
8. Formulate well-designed proofs.
9. Demonstrate an understanding of the historical development of logic and proof.

There are no specific program learning outcomes for this major addressed in this course. It is a general education core curriculum course and/or a service course. This course addresses the following Mathematics Standards set forth by the Texas State Board for Educator Certification (SBEC):

- **Standard II.** Patterns and Algebra: The mathematics teacher understands and uses patterns, relations, functions, algebraic reasoning, analysis, and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.
- **Standard III.** Geometry and Measurement: The mathematics teacher understands and uses geometry, spatial reasoning, measurement concepts and principles, and technology appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in order to prepare students to use mathematics.
- **Standard V.** Mathematical Processes: The mathematics teacher understands and uses mathematical processes to reason mathematically, to solve mathematical problems, to make mathematical connections within and outside of mathematics, and to communicate mathematically.
- Standard VI. Mathematical Perspectives: The mathematics teacher understands the historical development of mathematical ideas, the interrelationship between society and mathematics, the structure of mathematics, and the evolving nature of mathematics and mathematical knowledge.

Textbooks
The required text for this course is a set of notes by SFASU faculty. They are freely available and will be provided for download by the instructor.

Course Requirements
- D2L access. You will be required to access D2L (at http://d2l.sfasu.edu) and read and complete assignments and quizzes through the D2L system. You should logon daily to check for announcements, updates, and email messages from the instructor.
- Three proctored, pencil-and-paper exams. Exams are not taken online. The instructor will provide information about taking exams at SFA or with an off-campus proctor, which would be your responsibility to secure. You must arrange to take your exams with a proctor who can return exams to the instructor the same day, scanned as an email attachment.
  - Exam 1 (1.5 hours) must be taken February 5-9
    - On-campus opportunity Wednesday, February 7, drop in 4-8pm
  - Exam 2 (1.5 hours) must be taken March 5-9
    - On-campus opportunity Wednesday, March 7, drop in 4-8pm
  - Exam 3 (1.5 hours) must be taken April 9-13
    - On-campus opportunity Wednesday, April 11, drop in 4-8pm
- Final Exam (proctored, pencil-and-paper, 2 hours) taken May 7-10
  - On-campus opportunity Wednesday, May 9 drop in 4-8pm
- Reading the course notes and learning module “lectures” is essential to the learning process and is expected.
- Practice activities from the course notes should be completed and discussed via discussion boards as part of the learning process. Class activities are not collected for grading, so it is your responsibility to initiate questions and verify your work through interaction with your peers and instructor.
- Homework problems from the course notes and dropbox descriptions are essential to the learning process. Homework is collected for grading via D2L dropbox. Most people find it easiest to scan handwritten homework pages, but you may also type your homework. Please do not submit digital (smartphone or cellphone) photos of homework pages. A smartphone app such as CamScanner produces good results.
- Discussion board posts on research articles related to mathematical concepts, educational standards, and pedagogical issues.
- Exam corrections, in which you rework any exam questions for which you lost credit. Errors should also be classified according to the instructor’s criteria. These assignments should be submitted in writing and will be returned to you for editing until they are completely correct. Credit for this assignment will not be awarded until all errors are completely corrected. These assignments are classified as “online work” and will not alter exam grades.
- No campus meetings are required. You may come to campus to take exams or for office hours if you choose.
- Most work in the course will be due at 10:00pm on Fridays.

Course Calendar:
Course topics and percentage (time spent in class):
- Real Number System 20%
- Algebraic Thinking 65%
- Standards 15%

Grading Policy:
- NO LATE WORK IS ACCEPTED
- There is no extra credit.
- The final exam will not replace any other exam scores
- Some assignments can be rewritten; the instructor will provide this information. In order to earn the opportunity to rewrite an assignment, you must make substantial effort on the first submission. More than one rewrite opportunity will not be granted
- Most proofs will be graded on a Zero, Check-, Check, Check+ scale:
  - Check+. Work is completely accurate and essentially perfect. Work is thoroughly developed, neat, and easy to read. Complete sentences are used where appropriate.
  - Check. Work is good, but incompletely developed. The work contains the right idea but is flawed.
  - Check-. Work is sketchy. There is some correct work, but most of the work is incorrect.
  - Zero. Work is minimal or non-existent. There is no progress toward a correct proof.

The Final Grade will be determined by the scale:
100%-90% A, 89%-80% B, 79%-70% C, 69%-60% D, and 59% and below is an F. At my discretion, special consideration can be given to students who fully participate in the class.

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<tr>
<th>Online Work</th>
<th>Homework, discussion posts, exam corrections</th>
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<tbody>
<tr>
<td>Exams</td>
<td>Exams 1, 2 and 3</td>
<td>20% each</td>
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<tr>
<td>Final Exam</td>
<td>Final Exam (Comprehensive)</td>
<td>20%</td>
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**Attendance Policy:**
- **You should logon to the system daily** to check for email messages, announcements, and updates
- Exam make-ups must be approved **beforehand** with documentation of a valid university sanctioned excuse
- Late work is not accepted
- Bring identification to all exams
- The university’s Attendance and Excused Absences Policy can be found [online](https://example.com)

**Acceptable Student Behavior:**
- You may **NOT** use your cell phone as a clock or calculator on exams. You should NOT use your cell phone while in my office.
- I will send e-mail to the entire class during the course. Check your D2L e-mail daily
- Any disrespectful or disruptive behavior – including, but not limited to: side discussions, overt disruptions, name calling, harassing behaviors, etc. - may result in a referral to the appropriate university office.
- Please compose all emails as professional communications. This means checking for spelling, grammar, content, tone, and doing your best to use the resources available to you before reaching out to me. For example, my office hours are given in this document and test dates are available on the Tentative Course Timeline, so please locate this information yourself rather than messaging others to ask for it. That said, I am always here to answer mathematical questions. I encourage you to contact me rather than searching for answers (or videos) on the internet.
- The instructor reserves the right to amend these rules as necessary throughout the term.

**Acceptable Student Behavior (University Policy)**
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.
Add/Drop Policy
The Add/Drop Policy can be found online.

Withheld Grades Semester Grades Policy (A-54)
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go online

In addition, please inform the instructor if your disability affects your ability to view online content.

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Please be respectful of your fellow students and your instructor. Cell phone use and texting are not allowed in class. Remember to turn your cell phone off or place it in quiet mode before entering the classroom.

Academic Integrity (A-9.1)
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty. Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Any acts of academic dishonesty will be dealt with according to University policy. Penalties for academic dishonesty may result in a failing grade for the assignment, failing the course, or even dismissal from the university.

Please read the complete Academic Integrity Policy

“Two things are very important: teach joyfully and be strict, and because you want your student to learn the proper thing....”

- R. Sharath Jois