Foundations of Mathematics - MTH 300.500 Fall 2018 - Syllabus

About Your Instructor

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- **Department:** Mathematics and Statistics
- **Email:** beaversbd@sfasu.edu
- **Web Site:** http://faculty.sfasu.edu/beaversbd
- **Phone:** 936.468.1433
- **Offices:** Math Building 310, STEM Building 310
- **Office Hours:** 10-11am MTWRF in Math Building 310, weekly online optional chat, or by appointment

About This Course

**Class Meetings and Location:** Online class - no regular face-to-face meetings

**Required Materials:**
- *No required textbook*
- Functional computer and internet connectivity, preferably high-speed.
- Microsoft Office (available from SFA via mySFA and Office 365)
- A handheld calculator permitted but not required. Non-CAS calculators are the only calculators permitted during tests.

**Prerequisites:** Grade of C or higher in MTH 129 and MTH 138

**Course Description:** Set theory, relations, functions, mathematical structure, logic, and proof. Includes historical connections

**Course Overview:** Each of the ancient cultures has some form of mathematics, but the ancient Greeks, thanks to their emphasis on logic and deductive truth, left the greatest stamp on how mathematics developed in the Western world. The emphasis on explaining WHY something is true based on simpler principles and valid reasoning is the key to understanding how mathematics has developed over the millenia.
In this class, you will learn the logical reasoning and communication tools that are needed for advanced mathematics and why it is important to model these tools for your students, even if you never teach geometric proof in secondary schools. In this class, we have a variety of activities: readings, assignments, discussions and projects, both as an individual and in groups, to help you understand the concepts and develop necessary skills. Your course letter grade will be calculated as a weighted average of four tests and the series of assignments. Tests are intended to be instruments by which you can show what you have learned as the semester progresses; as a result, I require that there be a proctor present when you take each test in order to help guarantee that no academic dishonesty occurs. You may take your tests in person on SFA Campus (see details below) or you may take your tests at a testing center at a local library or community college (or individual proctors approved by me in exceptional circumstances). Please start considering your testing plans now, and note that some proctoring centers require a fee.

This course is dependent on technology and making machines do what we need them to do when we need them to do it. If you find a glitch in anything, it is your responsibility to inform me immediately! If it is something that I can fix, I will do so ASAP. Otherwise, I will direct you to other means of help. Only with such notifications will I consider extending deadlines as a result of technical difficulties.

Learning Objectives

Program Learning Outcomes: There are no specific program learning outcomes for the mathematics major addressed in this course. It is a general education core curriculum course and/or a service course.

Student Learning Outcomes (SLO): At the end of MTH 300, a student who has studied and learned the material should be able to:

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

About the Content Modules
There are nine content modules in this course. The first three concern logical reasoning. The next two are concerned sets and logic, which form the symbolic foundation of most modern mathematics. Finally, the last four modules introduce you to the basics of mathematical proof. Each module includes practice problems and Stop & Think exercises; solutions to these are provided at the end of each module. At the end of some module, you will be required to complete a module quiz over the content in the module. In some modules, you will also have assignments that must be submitted via the dropbox tool or discussion assignments that will be posted to the discussion board. Graded assignments will be included in the class participation part of your course grade.

The Discussion Board

The discussion board is the location where the you and your classmates will see any discussion assignments and post discussion responses that are to be shared with the whole class. Discussion assignments count toward the class participation portion of your grade. If you click the discussion tool, you will see that there are three items available to you on day one: Student Introductions, Errata Discussion, and Free Discussion. If you have already completed your student introduction, you should see that posted here along with the postings from your classmates. (Be sure to revisit this link so that you can find out who else is in the course with you!) The Free Discussion category is a place where we can talk in general about anything regarding the course. This is a place where you can post a question that you have about the course, whose answer might also serve other students.

In addition, you should see a category entitled "Errata Discussion". Although I have tried to make sure that all information is correct, it is always possible to find errors. For example, if you find a link that is not working, please post that information to the Errata Discussion board including where the link is located in the module. All error captures to this board are greatly appreciated by the designer of the course!

Course Requirements

Your course grade will be calculated based on individual and group assignments and in-class exams.

Course Outline and Topics:

<table>
<thead>
<tr>
<th>Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting Started</td>
</tr>
<tr>
<td>Module I: Logic - Definitions</td>
</tr>
</tbody>
</table>
Grading Policy

Computation of Course Grade

Your course grade will be determined by your performance on graded work in the following categories: (1) assignments (both individual and group), (2) three tests (3) a comprehensive final exam. Your final course grade will be the weighted mean as follows:

- "Participation" - 10%. This is the mean of your scores, equally weighted, on the various assignments that I will collect during the course. Many assignment will be written homework to be turned in to D2L’s Dropbox feature. Some will be discussions or quizzes in D2L. All assignments will be detailed in the module and checklist in D2L.
- "Test 1," "Test 2," and "Test 3" - 20% each, and "Final Exam" - 30%. You will be required to complete three tests and a final during this course. For each test, you will be allowed 1.5 hours, and 2 hours for the final exam. These must be completed on the SFA campus at designated times or at an approved testing center.

Off Campus Test Dates (Off campus testing arrangements are your responsibility so please begin making arrangements for the first test now. Please ensure that the testing center that you choose will return your exam to me by 8 pm on the last day of the testing window.)

<table>
<thead>
<tr>
<th>Test 1: September 17-19</th>
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<tbody>
<tr>
<td>Test 2: October 15-17</td>
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<tr>
<td>Test 3: November 12-14</td>
</tr>
<tr>
<td>Final Exam: December 10-12</td>
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</tbody>
</table>
On Campus Test Dates: 4 - 8 PM in Math Building Room 101 or Kennedy Auditorium

Test 1: September 19
Test 2: October 17
Test 3: November 14
Final Exam: December 12

Score Descriptors

Tests, the Final Exam, certain assignments, and your final course letter grade will be graded on the "standard 10-point" scale based on the percentage (rounded to the nearest percent) of total points earned by the student on the exam or on assignments:

<table>
<thead>
<tr>
<th>Letter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>[90%,100%]</td>
</tr>
<tr>
<td>B</td>
<td>[80%,90%)</td>
</tr>
<tr>
<td>C</td>
<td>[70%,80%)</td>
</tr>
<tr>
<td>D</td>
<td>[60%,70%)</td>
</tr>
<tr>
<td>F</td>
<td>[0%,60%)</td>
</tr>
</tbody>
</table>

Most assignments will be graded holistically on a 0-10 scale based on completion and performance; the overall Assignment course component will be the mean of these scores converted to a percentage. The various scores are described below. To summarize, a "passing" score is a 7 or higher and a "failing" score is a 6 or lower. Each score will take execution, communication, and correctness into account. I am using this system so that I can better communicate to you whether you understand the material well enough or not. Your primary goal is to earn a 7 or better on each assignment. In addition, for any group assignments, participation by each group member will be considered.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0-5</td>
<td>Failing (&quot;F&quot;)</td>
</tr>
<tr>
<td>6</td>
<td>Deficient (&quot;D&quot;)</td>
</tr>
<tr>
<td>7</td>
<td>Average (&quot;C&quot;)</td>
</tr>
<tr>
<td>8</td>
<td>Good (&quot;B&quot;)</td>
</tr>
<tr>
<td>9 or 10</td>
<td>Oustanding (&quot;A&quot;)</td>
</tr>
<tr>
<td>Score Description</td>
<td>Score Description</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>This score means that either you did not complete the assignment, or your</td>
<td>This score means that you show some understanding but the flaws in mathematics or</td>
</tr>
<tr>
<td>mathematics or communication shows serious and fundamental errors. You need to</td>
<td>communication are not sufficient to be considered passing.</td>
</tr>
<tr>
<td>review prerequisite material and the basics of what was being assessed. You must</td>
<td></td>
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<tr>
<td>complete every assigned problem in order to score higher than a 5.</td>
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<tr>
<td>Note that certain mistakes by themselves will automatically drop you to a 6 or</td>
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<tr>
<td>lower because they are common but fundamental errors that wreck havoc on the</td>
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<tr>
<td>truth of your work or fundamentally change the difficulty level of the task at</td>
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<tr>
<td>hand. Also, be sure to think about what your writing communicates to a reader. I</td>
<td></td>
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<tr>
<td>grade what you have said, not what you meant to say.</td>
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</tbody>
</table>

**General Course Policies**

- Please don't hesitate to contact me if you have questions. You may e-mail me, send a chat message in *Microsoft Teams*, call my office, leave a voice mail, or use chat in D2L. I will be in my office during schedule office hours if you'd like to drop by for help. I will also be glad to schedule meetings at other times; as half my duties are technical support for the College of Sciences and Mathematics, I am usually on campus 9-5 every weekday.
- I will likely send e-mails to the entire class, so please check your D2L e-mail address regularly or forward your messages to an account you check frequently. I will also send announcements via *Microsoft Teams*. I would also highly recommend that you sign up for JackText or update your JackText preferences.
- Cheating is a most serious offence, with a wide range of penalties up to and including expulsion from the university. See also the official SFA policy later in the syllabus. Every faculty member has a different policy on what he or she considers cheating or getting unauthorized help. Be sure to talk to me and your other professors about what they consider cheating. Here are some of the ways I define cheating (academic dishonesty) for the various types of work in this class.
  - Assignments: I expect your work to reflect the results of only your independent mental effort and communication skills. Copying or *paraphrasing*, in whole or in part, from any sources, including your fellow graduate students, *without citation* or *without permission* is considered academic dishonesty. You may use content from course materials (class notes, the textbook) without attribution. You may work with other students on assignments where I explicitly say that it is OK.
Exams: You may use calculators (for computations, if you wish) on exams, but no other resources unless I specify before the exam.

- Make sure you have read this entire syllabus carefully because you are responsible for what lies within it.

Classroom, Attendance, & Makeup Policies

- It is your responsibility to be aware of due dates and to have access to a computer and other equipment that can handle the necessary work, and to schedule enough time to complete the assignments.
- Generally, missed assignments cannot be made up except in the case of an extended, but excused, absence (such as a week-long illness).
- Deadlines may be extended at the discretion of the instructor in case of exceptional technical difficulties, but you should make every effort to avoid doing things at the last minute.
- Discussions require time to develop. Please start on discussion assignments immediately so your classmates can have time to consider and respond.
- Please don't hesitate to contact me if you have questions. You may call my office, leave a voice mail, use chat in D2L, or e-mail me. I only have five scheduled office hours on campus, but half my duties are technical support for the college, so I can usually easily be found in or around my office, the math building, or the science building during the week. So, schedule a time to meet me in person or online during the week if my office hours don't fit your schedule.
- However, you should hesitate to contact me if the information you are asking about can be found in the syllabus or content in D2L. Check those resources before asking me. Issues needing your immediate attention will be posted as news items. I will regularly post news items to remind everyone of upcoming due dates and needed announcements.
- You bear some responsibility to help make the class a welcoming learning environment. See the SFA Way, below, as a reminder of how we all can work together to make this class a safe and respectful learning environment. I also pledge to follow the SFA Way
- You are expected to participate every day and to contribute substantively to each group project; your grade on assignments can be affected by nonparticipation. As a 3 hour course, state policy is that you should expect to spend at least nine hours per week on the activities of this course.
- Cheating is a most serious offence, resulting in a grade of 0 on the assignment and being reported to the university. Here are some of the ways I define cheating (academic dishonesty) for the various components of this class. These are examples and not exhaustive lists of what I consider cheating. If you have any question as to what I consider cheating, contact me before you turn in the assignment.

See also the official SFA policy later in the syllabus.

- Overall: Copying or paraphrasing from any source without citation or without permission
- Tests and final exam: Do not use any materials besides those provided at the test or otherwise expressly permitted by the instructor, except for your calculator and a writing instrument. Water or other drinks are permitted at the discretion of the instructor after inspection. You may use any calculator if you want, however I will check any graphing calculator for notes. You may not ask anyone about anything on the test while taking the test. The test is supposed to measure your
individual assimilation of the material at the time of the test. For those of you testing off campus, your chosen testing center may have more restrictive requirements than me.

- Group assignments: Copying or paraphrasing from any other groups or anyone outside the course. Using projects submitted by students who have previously taken the course is also considered academic dishonesty. Only use the resources allowed in the instructions.
- Individual assignments: Copying or paraphrasing from other students is prohibited. Individual assignments are intended to measure your understanding of the material of the course, not anyone else's. As individual work, it is normal to expect that your work should have some significant differences that indicate your individuality. Just changing a few words or symbols from someone else's work counts as cheating. You work should reflect your true understanding of the material, not just responses parroted or cobbled together from others in class or outside class, including the internet in general. With advance permission, you may work together on some assignments. But if you do so, indicate who you worked with in the assignment. You should make a deliberate effort to make your work look different from the person you worked with. "We worked together" is not a valid excuse for individual assignments to look the same unless you have explicit permission from me.

- Make sure you have read this entire syllabus carefully because you are responsible for what lies within it. Ignorance of the rules is not an excuse.

The SFA Way

"...striving for personal excellence in everything that we do."

At Stephen F. Austin State University, our faculty, staff, alumni and students believe in doing things "The SFA Way." We expect the best from ourselves and from each other, and we hold each other accountable when we fail to maintain these standards.

Root Principles

Grounded in the five "Root Principles" below, members of the SFASU community seeks to strive for personal excellence in everything that we do.

The Principle of Respect:

Lumberjacks command respect and treat others with respect • They are considerate of others and tolerant of differences • They demonstrate respect for those around them by avoiding the use of offensive or profane language • They do not threaten or harm anyone and deal peacefully and civilly with conflict.

The Principle of Caring:

Lumberjacks think of the needs of others and seek to improve the quality of life of those around them • They are compassionate, empathic and kind • They respond with humility to those they have helped and express gratitude freely to those who help them • Lumberjacks prepare themselves to become leaders in their communities and workplaces • They dedicate themselves to excellence in their chosen field of study and to using what they learn in the service of others.

The Principle of Responsibility:
Lumberjacks do what is right • They persevere in times of adversity • Through self-control and self-discipline, they strive to do their best • Lumberjacks challenge each other to exceed expectations • They are active learners both inside and outside of the classroom • They are reliable; they do what they say they will do • Lumberjacks hold themselves accountable for their decisions.

*The Principle of Unity:*

Lumberjacks are loyal to their friends, family, university, state and country • Lumberjacks stand together against any adversary • They recognize that though we are very different from one another, we are united by the Lumberjack Spirit. Lumberjacks seek to understand the people and world around them • When one lumberjack fails, all fail • When one lumberjack succeeds, all succeed.

*The Principle of Integrity:*

Lumberjacks have the courage to do what is right, even when it is hard or unpopular • They respond to each situation with steadfast values that are not subject to change based on the actions of others • They seek opportunities to practice effective and ethical leadership • Lumberjacks are honest; they do not deceive, cheat or steal • Lumberjacks stand up for those who cannot stand up for themselves • As lifelong learners, lumberjacks are committed to continuously improving themselves.

**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) falsification or invention of any information, including citations, on an assignment; 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 include, but are not limited to: (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 the Internet or another source; and, (3) incorporating the words or ideas of an author into one's paper or presentation without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp (http://www.sfasu.edu/policies/academic_integrity.asp).

**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.

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**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 to [http://www.sfasu.edu/disabilityservices/](http://www.sfasu.edu/disabilityservices/).

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**Acceptable Student Behavior**

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.

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