About Your Instructor

- Instructor: Dr. Brian Beavers, Department of Mathematics and Statistics, Stephen F. Austin State University
- Office: Bush Mathematical Sciences Building 310
- ZOOM Personal Meeting Room: sfasu.zoom.us/my/drbeaverssfa
- Email: beaversbd@sfasu.edu
- Telephone: 936.468.1433
- Office Hours: 2-3pm MW, 10am-12pm T, 10-11am R, or by appointment

Course Meetings and General Expectations

Meeting Time and Location

10:00am - 10:50am MWF in Bush Mathematical Sciences Building Room 205

Course Expectations

The following is an excerpt from SFA Policy 5.4:

The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;
2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class each week for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation. Students should check daily for course announcements.

Materials

- Required Materials
  - Computer with internet access for online resources.
  - Scientific (non-graphing) calculator for use on tests, homework, and in-class work. I recommend the TI-36X Pro.
- Optional/Reference Materials
  - Texts for Reference - Notes and homework assignments will be provided online to students at no cost. The fundamentals of analytic geometry have been around for a while and many resources are available. Here are a couple of supplemental texts (with more available upon request):
    - *Analytic Geometry, 6th edition* by Douglas F. Riddle (ISBN: 97805349498542). This text was required in previous semesters but is not required this semester.
    - *Analytic Geometry*, by Maria M. Roberts and Julia T. Colpitts, available on the Internet Archive. This is an out-of-copyright text that can be used as an optional reference.
  - Desmos.com. This is an excellent online calculator.
  - Graphing calculator. While graphing calculators are prohibited on tests, you may use graphing calculators to help you on homework and in-class work unless otherwise instructed.
About This Course

In the development of mathematics, the advent of analytic geometry was a true revolution in problem solving. Early in the history of mathematics, geometry was used to solve algebra problems. In the middle ages, algebra became a more important and easier-to-use tool through advances from the Islamic world and the rising merchant societies of Europe. This set the stage for analytic geometry. Mathematicians discovered that it is often much easier to solve geometric problems by using algebraic techniques, and now we tend to view many geometric math problems in terms of coordinates and equations. Analytic geometry methods are essential for calculus, and thus we will review these topics as preparation on your way to MATH 2313.

**Prerequisites:** MATH 1314 and MATH 1316, or equivalent.

**Course Description:** Beginning course in plane analytic geometry including the straight line, the circle, parabola, hyperbola, and the transformation of coordinates.

**Course Topics**

We will cover the fundamental concepts and techniques of analytic geometry. Please see the course calendar in the content area of our course in D2L for our course topics, links to readings and assigned homework, and deadlines. Here is a general outline with estimated percentages of time covered:

<table>
<thead>
<tr>
<th>Points, Equations, and Loci</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vectors in the plane</td>
<td>5%</td>
</tr>
<tr>
<td>Lines</td>
<td>10%</td>
</tr>
<tr>
<td>Conic sections</td>
<td>25%</td>
</tr>
<tr>
<td>Coordinate transformations</td>
<td>15%</td>
</tr>
<tr>
<td>Curve sketching</td>
<td>15%</td>
</tr>
<tr>
<td>Polar coordinates and parametric equations</td>
<td>10%</td>
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</tbody>
</table>

**Learning Objectives**

At the end of MATH 1318, a student who has studied and learned the material should be able to:

1. Solve problems involving lengths and distances in the plane, including midpoint and point-of-division formulas.
2. Demonstrate understanding of the notions of slope and inclination of lines, including angles between lines, parallel lines, and perpendicular lines.
3. Recognize the relationship between equations in two variables and graphs in the plane and use the equations to find pertinent information such as points of intersection, and intercepts.
4. Perform arithmetical and geometric operations involving vectors in the plane.
5. Use vectors to solve geometric and physical problems.
6. Sketch graphs of and discuss relevant features of curves in the plane determined by certain equations (including lines, circles, parabolas, ellipses, hyperbolas, polynomial functions, rational functions, and features such as slope, inclination, center, radius, vertices, foci, axes, eccentricity, intercepts, asymptotes).
7. Determine equations of curves when given information that determines the curves.
8. Perform translations and rotations of the coordinate axes to eliminate certain terms from equations.
9. Model real world situations with equations of conics.
10. Use the polar coordinate system, relate it to the rectangular coordinate system, and graph equations using polar coordinates.
11. Sketch graphs in the plane determined by parametric equations by direct sketching as well as elimination of the parameter to obtain a rectangular equation.

**Department Syllabi:** Please see the departmental course syllabus at [http://math.sfasu.edu/docs/syllabi/MATH1318Syllabus.pdf](http://math.sfasu.edu/docs/syllabi/MATH1318Syllabus.pdf) for more policies and course details.

Assignments and Grading Policy
**Grade Components:**

Your course grade will be determined by the weighted average of three regular tests, in-class quizzes, one or more special projects, and a comprehensive final exam.

**Tests and final exam:** You will have three regular, written, in-class tests. Each will primarily cover the material since the last test. However, as topics tend to build in math classes, often material from earlier in the semester will be implicitly included on later tests. The final exam will be written, in-class and comprehensive, covering all the material covered in class with emphasis on that covered after the third test. Each regular test is 20% of your final course grade and the final exam is 25%. Tests cannot be made up unless you miss multiple tests with a valid excuse; if you miss only one test, with a valid excuse I will let the final exam replace that missed test. Scientific non-graphing calculators are permitted on tests.

**Quizzes:** we will have daily in-class quizzes at the beginning of each class after time for homework questions. These should take no longer than 5 minutes. I will score each of these quizzes out of a max of 10 points and convert the average to a percentage that will count 10% of your final course grade. These daily quizzes cannot be made up, but I can excuse you from them with sufficient justification (e.g., long term illness). At least your two lowest quizzes will be dropped at the end of the semester, so that should take care of most absences without need keeping track of excused absences. Handheld calculators, including graphing calculators, are permitted on quizzes.

**Projects:** analytic geometry is highly practical. It is how most modern computer visualization is done. You will have some small projects during the semester to help you apply analytic geometry to modern applications. I will score each of these out of a max of 10 points and convert the average to a percentage that will count 5% of your final course grade. Projects will be submitted to D2L dropboxes by announced deadlines.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Percentage of Course Grade</th>
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<tbody>
<tr>
<td>Tests</td>
<td>3 at 20% each</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
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<tr>
<td>Projects</td>
<td>5%</td>
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<tr>
<td>Comprehensive Final Exam</td>
<td>25%</td>
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<table>
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<tr>
<th>Test Schedule:</th>
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<tbody>
<tr>
<td>Test 1</td>
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<td>Test 2</td>
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<td>Test 3</td>
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<td>Final Exam</td>
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<tr>
<th>Grading Scale:</th>
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<tbody>
<tr>
<td>90 to 100 = A</td>
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<td>80 to 89 = B</td>
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<tr>
<td>70 to 79 = C</td>
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<tr>
<td>60 to 69 = D</td>
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<tr>
<td>below 60 = F</td>
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**General Policies**

- **Homework:** homework will be assigned daily but will neither be picked up nor graded. You are expected to attempt all assigned problems and get help on any you find difficult. To get help, I am available in office hours and by appointment.
(including via ZOOM) and the AARC is an excellent place to get help via drop-in tables or one-on-one tutoring.

- **Class attendance:** I will take class attendance, but it will not directly count towards your course grade. Attendance indirectly affects your final course grade in two main ways: (1) if you stop attending you will get a QF for the course and (2) missing daily quizzes or tests with an unexcused absence results in a score of zero for that quiz or test. If you miss class, it is your responsibility to consult the calendar in D2L and contact me or your classmates about what you missed and what you need to do before the next class you attend.

- **Class participation:** students are expected to attend all class meetings, arriving on time, participate in classroom activities, and stay until the end. If you leave a class early without informing me ahead of time, I may discard your quiz for that day and you will receive a score of 0/10 for the quiz. Be sure to rest and come to class alert and ready to participate. If you sleep or provide a persistent negative distraction to the classroom experience, I may ask you to leave. You would also forfeit your quiz score (receive a score of 0/10) for the day.

- **Preparing for class:** students are expected to spend several hours between class meetings reviewing class notes, reading provided materials, working homework problems, and conferring with others to get help on areas of conceptual misunderstanding and difficulty on homework problems. Review of prerequisite material may also be warranted for topics you might not have completely mastered.

- **Communication:**
  - My preferred methods of communication for class-related issues are face-to-face or ZOOM meetings, email, and Microsoft Teams.
  - I am usually on campus 9am-5pm Monday through Friday but my duties often take me out of my office. My designated office hours are a time when you are guaranteed to find me in or around my office and I will be available for assistance. In the rare occasion where emergency duties or illness keeps me from keeping office hours, I will post a notice on my office or send a message by email or Teams with instructions on how to find me or when office hours have been rescheduled. You are welcome to contact me to schedule an appointment to meet at other times besides office hours during the week to get help.
  - Be sure to monitor Teams and email for announcements. Email is always welcome, but depending on other work duties I may take up to 24 hours to reply. I will include everyone in the class in a chat group in Microsoft Teams. This chat group is a good place to get quick assistance and you can also send me a direct message in Microsoft Teams. If I cannot respond to a chat message immediately, one of your classmates might be able to assist. You are also welcome to call my office phone number to reach me or leave a voice message.
  - If you miss a test due to an emergency situation on the day of the test, I expect you to contact me immediately; Teams will likely be the most convenient method.
  - You can find this syllabus, a calendar of topics, homework assignments, and deadlines in D2L. In D2L I will also post class notes and other relevant materials, dropboxes for projects, and all of your grades.

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**Tips For A Successful Math Class**

- Sleep and relax! Well...outside of class, that is. It is hard to do math well with a tired or anxious mind!
- Learn mathematical terminology! It’s hard to think and talk about concepts when you don’t know what the words mean that we’re using. For any math word, be able to give a formal definition, an informal definition, an example that illustrates the concept, and “non-examples” (examples of situations that are close to being right, but not quite).
- Do. The. Homework. All of it. Several times if necessary. Create new problems if you run out of problems to practice.
- Strategize! Take the time to think about how the different types of problems are solved and create a road map in your mind how to get to the solution.
- The quality of the time is as important as the quantity of the time you spend studying. You have to understand the concepts and basic examples before you can master the harder problems. Regularly look back at the big picture when you get stuck on an immediate detail.
- Get help! If you’re alert, know the words, and understand the examples but are still stuck, then get help from me or a tutor.
- Learning math is a lot like learning anything else – sports, music, etc. Some have natural talent and some don’t, but with a bit of effort, everyone can do it! At the beginning, you have to drill those basic moves until you can do them almost without thinking in order to overcome your anxiety. Only then can you concentrate on improving your skills and learning more sophisticated moves. I am your coach; I can’t make the moves for you. I can show you the mechanics of the move and explain why the move does what it does, but only you can do it for yourself. You must both practice and reflect on your performance in order to win!
- Find your motivation and hold onto it! It’s hard to do well in something you don’t want to do, and it’s easy to get lost in the drudgery and lose focus. But, math can be very beautiful and enjoyable with a little motivation!
"...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.
**Course description:** Beginning course in plane analytic geometry including the straight line, the circle, parabola, hyperbola, and the transformation of coordinates.

**Credit hours:** 3

The following is an excerpt from SFA Policy 5.4:

*The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:*

1. **Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;**

2. **At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.**

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

**Course Prerequisites and Corequisites:** Math 1314 and 1316, or the equivalent.

**Course outline:**

- **Introduction to plane analytic geometry**
  - Points in the Cartesian plane
    - Distance formulas
    - Point of division formulas
  - Analytic descriptions of lines
    - Inclination
    - Slope
    - Angle from one line to another
  - Graphs of curves
    - Points of intersection of curves
    - Equation of a locus of points

- **Vectors in the plane**
  - Geometric and component representations of vectors
  - Dot products and angles between vectors
  - Applications of vectors in geometry and physics

- **Lines**
  - Point-slope and two-point forms
  - Slope-intercept and intercept forms
  - General form
  - Distance from a point to a line
  - Families of lines

- **Conic sections**
  - Analytic definitions of the conic sections
  - Circles
  - Parabolas

<table>
<thead>
<tr>
<th>Course outline</th>
<th>Approximate time spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to plane analytic geometry</td>
<td>20%</td>
</tr>
<tr>
<td>Vectors in the plane</td>
<td>5%</td>
</tr>
<tr>
<td>Lines</td>
<td>10%</td>
</tr>
<tr>
<td>Conic sections</td>
<td>25%</td>
</tr>
</tbody>
</table>
Ellipses

Hyperbolas

- Coordinate transformations
  o Translation of axes
  o Rotation of axes
  o The general second degree equation

- Curve sketching
  o Domain, symmetry, intercepts, asymptotes
  o Graphs of polynomials
  o Graphs of rational functions

- Polar coordinates and parametric equations
  o Introduction to polar coordinates in the plane
  o Conversion between rectangular and polar coordinates
  o Graphs of polar equations
  o Introduction to parametric equations of curves in the plane

Student Learning Outcomes (SLO): At the end of MATH 1318, a student who has studied and learned the material should be able to:

1. Solve problems involving lengths and distances in the plane, including midpoint and point-of-division formulas.
2. Demonstrate understanding of the notions of slope and inclination of lines, including angles between lines, parallel lines, and perpendicular lines.
3. Recognize the relationship between equations in two variables and graphs in the plane and use the equations to find pertinent information such as points of intersection, and intercepts.
4. Perform arithmetical and geometric operations involving vectors in the plane.
5. Use vectors to solve geometric and physical problems.
6. Sketch graphs of and discuss relevant features of curves in the plane determined by certain equations (including lines, circles, parabolas, ellipses, hyperbolas, polynomial functions, rational functions, and features such as slope, inclination, center, radius, vertices, foci, axes, eccentricity, intercepts, asymptotes).
7. Determine equations of curves when given information that determines the curves.
8. Perform translations and rotations of the coordinate axes to eliminate certain terms from equations.
9. Model real world situations with equations of conics.
10. Use the polar coordinate system, relate it to the rectangular coordinate system, and graph equations using polar coordinates.
11. Sketch graphs in the plane determined by parametric equations by direct sketching as well as elimination of the parameter to obtain a rectangular equation.

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.

Academic Integrity

The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one's self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.
Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

**Withheld Grades Semester Grades (SFA Policy 5.5)**
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. For additional information, go to https://www.sfasu.edu/policies/course-grades-5.5.pdf.

**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.

**Student Wellness and Well-Being**
SFA values students’ overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

**On-campus Resources:**
The Dean of Students Office (Rusk Building, 3rd floor lobby)
www.sfasu.edu/deanofstudents
936.468.7249
dos@sfasu.edu

SFA Human Services Counseling Clinic Human Services, Room 202
www.sfasu.edu/humanservices/139.asp
936.468.1041

The Health and Wellness Hub “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services

sfasu.edu/math
• Counseling Services
• Student Outreach and Support
• Food Pantry
• Wellness Coaching
• Alcohol and Other Drug Education

Crisis Resources:
• Burke 24-hour crisis line: 1.800.392.8343
• National Suicide Crisis Prevention: 9-8-8
• Suicide Prevention Lifeline: 1.800.273.TALK (8255)
• Crisis Text Line: Text HELLO to 741-741

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 10.4). 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.

Date of document: 08/23/2023