MATH 1414 (4:3:1)

STEM COLLEGE ALGEBRA

MATHEMATICS DEPARTMENT

Division of Arts & Sciences

South Plains College

Fall 2024

Shirley Davis

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South Plains College

MATH 1414 – STEM College Algebra for Scientists & Engineers
Section 001, M W 1 – 3:05 pm
Math Bldg., Rm. 105

I. Instructor Info
Professor: Miss S. Davis
Office: 103 MATH Bldg.
Phone: (806) 716 – 2699
E-mail address: sdavis@SouthPlainsCollege.edu

Office Hours:

Monday	Tuesday	Wednesday	Thursday	Friday
10:35 – 11am	10:45 – 12pm 2:15 – 4:15pm	10:35 – 11am	10:45 – 12pm 2:15 – 3:45pm	1 hour *(Designated time posted weekly)*
or by appointment				
At these designated times, I will be available to help you. You **do not** need an appointment for office hours. When you come by, I may be assisting another student, but please wait patiently, and I will attend to you eventually.				

Table 1 – Office Hours

II. Course Info
Course Description:
This course is an in-depth study of the complex number system, factoring methods, solving techniques for equations & inequalities, and linear, polynomial, rational, radical, exponential & logarithmic functions & their graphs, systems of equations & their applications, and linear programming. Assisted conceptual tools as analytical geometry are utilized and additional topics as conics, sequences, series, and probability are included.

Text:
College Algebra, 7th ed. by Robert Blitzer, 2018 Pearson (**ISBN: 978-0-13-446916-4**)

Supplies:
Scientific calculator (or graphing calculator), Graph paper, a ruler, *(at least a **3 in** ring) notebook,* hole puncher, stapler, a staple puller, & a red pen/pencil.
(If your lack of responsibility results in you asking to borrow any of the supplies from me then there will be automatic 5 point deduction from your final grade. **Bring your supplies to class everyday!**)

Purpose:
This course is to provide an advanced course in college algebra for STEM majors. Topics included are: real & imaginary numbers, ratio & proportion, factoring, the binomial theorem, variation, theory of equations & their applications, inequalities, determinants & matrices, linear programming, mathematical induction, conics, permutations & combinations, sequences, series, and progressions.

III. Attendance Policy
Attendance:
Lectures, effort, engagement, and Q&A are the most important activities for success in this course. The instructor maintains records of the student's attendance and submission of assignments throughout the semester. The student is expected to attend at least eighty percent (80%) of the total class meetings and submit at least eighty percent (80%) of the total class assignments to have the best chance of success. If the student fails to meet these minimum requirements, the instructor has the right to drop the student with a grade of F or an X, depending on the instructor's discretion.

IV. Equipment

    A.

        1.) Internet access
- Working, reliable internet access with the ability to view videos via Blackboard or YouTube.
- Libraries, school and public communities, are a great source to computer accessibility.

        2.) Computer (laptop highly recommended) and Webcam

        3.) **Blackboard (Bb)**
- The online course management system that will be used for this course.
- A wealth of information is provided to you for this class in the **CA Bb**. All the information for this class will exist on Blackboard including but not limited to syllabus & compendium, homework assignments, worksheets supplements, videos, & etc., but additional material involves Classroom Conduct, Technological & Equipment info & assistance, Tutoring opportunities, previous semester student evaluations, and miscellaneous administrative information. Please be responsible to log in to Blackboard and visit **CA Bb** page and peruse through it to become familiar with all the items.
  Login at http://southplainscollege.blackboard.com . The user name and password should be the same as the MySPC and SPC email.

                User name: first initial, last name, and last 4 digits of the Student ID

                Password: Original Campus Connect Pin No. (located on SPC acceptance letter)

- *Technical Support:* Student support is available by emailing blackboard@southplainscollege.edu or calling 716-2962. When emailing a request for help, include your full name, course(s) enrolled in, name of instructor(s) and a phone number where you can be reached.
- *Blackboard Tutorials.* Blackboard video tutorials are available at http://ondemand.blackboard.com/students.htm.
- *Blackboard App.* A free Blackboard App is highly suggested and recommended and can be downloaded in the APP store specific to your cell phone and can be found on **CA Bb**.

        4.) Calculator
- A scientific calculator for this course is recommended.
- Acceptable: TI-83, TI-83+, TI-84, TI-84+, or TI-84+ Silver Edition but many others are also acceptable.
- Any other graphing calculator, you will need to read you manual to determine how to make the processes work.
- The TI graphing calculator model is not allowed in this class: TI-Nspire.
- Cell phones and similar devices may NOT be used as calculators and no sharing of calculators is allowed.

        5.) Other Resources
- You are expected to keep up with the schedule set forth by the due dates of the homework assignments and the exams. If you need help, please ASK! Here are some other good resources online:
  - Your instructor is your first and BEST resource for any help!!!!
  - Free online math videos at www.khanacademy.org, www.patrickjmt.com, www.mathtv.com, & MIT Opencourseware.

        6.) Troubleshooting
- Computer Issues
  - If your personal computer becomes "disabled", then you will need to seek an alternate computer source.

V. Coursework Policies

Assignment Policy:

Homework will be assigned daily (located on **CA Bb**). <u>You are expected to work all problems assigned in each assignment and to seek help when you do not understand.</u> You are responsible for keeping up to date and prepared. <u>Homework is to be completed and be kept in a notebook that must accompany you to each (f2f) class session</u>. The homework assignments maybe graded periodically. *However, the practice is required in order to more fully understand each topic and to successfully negotiate the quizzes and the tests*.

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Late homework is <u>not</u> accepted.

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Assessments:

There will be random quizzes given over the assigned homework in which no make-ups will be allowed. The total number of quizzes for the semester is unpredictable but only a portion will count as the quiz grade. **Make-up quizzes will NOT be given.** Worksheets could also be distributed and subjected for grading.

Tests:

There will be four tests (final exam exclusive) face-to-face (f2f) unless circumstances change. Exams will be f2f unless there exist **verified extenuating circumstances** in which the exams will be conducted online through virtual meetings. The final exam will be comprehensive.

If the final exam score is greater than the lowest non-zero major exam score then the final exam score replaces the lowest major exam score. In other words, the lowest major exam score will be deleted, and the final exam score will count two times (an exception is the Honest Effort Rule (**H.E.R.**) policy). See your OUTLINE for the approximate date for each test.

Make-up Policy:

There is no automatic provision for making up exams. Only under **verified extenuating circumstances** (e.g., death in the family, hospitalization, +COVID test) will make-up exams be inevitable. These situations will be dealt with on a trial-by-trial basis. If at all possible, the instructor should be notified prior to missing an exam.

If you happen to miss an exam, a grade of **0** will be administered, and under the **H.E.R.** (Honest Effort Rule), this missed exam of grade **0** <u>will not</u> be replaced by the final exam even if the final exam is greater.

Grading Policy:

Your final grade will be based solely on major exam scores, homework/quiz average, and a comprehensive final.

Grading Homework:

Homework will be graded either by completion or by correctness. If the homework procedure is not followed, deductions will be made. Below is the legend for homework graded on completion

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√++	**100**
√+	**75**
√	**50**
√ -	**25**

Table 2 – Homework Grading Legend

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Grading Score:

$$\text{Final score} = \frac{\text{Test 1} + \text{Test 2} + \text{Test 3} + \text{Homework/Quiz Avg.} + \text{Final Exam score}}{5}$$

> ***NOTE***: If the final exam score is greater than the least non-zero major exam score (excluding the Homework/Quiz avg.) then the final exam score replaces the least non-zero major exam score. In other words, the major exam score will be deleted and the final exam score will count two times.

Grading Scale:

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A:	90 and above		D:	60 – 69
B:	80 - 89		F:	59 or below
C:	70 - 79			

Table 3 – Grading Scale

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<u>**Borderline Grades:**</u> These grades will be evaluated with regard to attendance and mature conduct in class.

Study:

You should normally spend approximately 2-3 hours outside of class to study for each hour of lecture. Some material will require more time than other material. Also, your mathematical background is a major factor in the time spent completing the homework. Try to study the assigned lesson as soon after the class meets if possible. With your greatest effort, try not to get behind on the homework! Refer to the "How to Study" sheet for further detailed studying suggestions.

Notebook: Homework, quizzes, tests, and other useful material should be kept in a notebook in which the notebook will be used as a reference and study guide. The notebook will be brought to class everyday! The following material will be placed in the notebook in the order listed:

a.) Cover sheet including Name, Class, and Semester,
b.) Syllabus,
c.) Procedure pages,
d.) Assignment sheet,
e.) Notes,

f.) Work,
g.) Quizzes,
h.) Tests, &
i.) Miscellaneous

Table 4 – Notebook Material

*To print all the material for your notebook, please visit the **CA Blackboard** page. All printed material needs to be read at least once during the term of this course.*

Tutoring:

Free tutoring is available in the Math-Engineering building (Levelland campus, room M116) and online. For the Math-Engineering building tutor, please remember to sign in when you seek help from a tutor. For free online tutoring, please refer to **CA** Bb.

Video Review Recordings:

Video Review Recordings for many topics in this course are available in the Math. Department AVT lab (Rm. 116 of the Levelland campus). The web address for the online videos is as follows (http://spc.blackboard.com/webct/entryPageIns.dowebct). For username and password, please use ***mvideos***. For the AVT lab on the Levelland campus, students are allowed to check the tapes out, view them in the office, or duplicate them with the equipment available in Rm. 116.

Tape	Topic	Tape	Topic
College Algebra			
39, 60, 105, 106, 107	Factoring	132, 133	Exponential & Logarithmic Functions
122, 301	Lines & Slope	146	Binomial Theorem
49, 124	Functions	134	2 x 2 systems
	Functions – Domain – Range Part 1	135	3 x 3 systems
	Functions – Domain – Range Part 2	137	m x n systems
67, 116	Complex Numbers	140	Operations with matrices
64, 110	Linear Equations	50, 138	Solving systems of equations using matrices
112, 113, 114	Quadratic Equations	142	Determinants
118	Other Types of Equations	144	Cramer's Rule
Analytical Geometry			
310	Parabolas		Parametric Equations
320	Ellipses	335	Polar coordinates
325	Hyperbolas		

Table 5 – Math Video Reviews

Critical Dates:

Sept 2	Labor Day Holiday	Nov 8	WEB Pre-registration for Winter Interim & Spring 2025
October 18	Fall Break	Final Exams	
Nov 27 – 29	Thanksgiving Holiday	Dec 9	(8 – 10, Monday)
Dec 4	Last Day to Drop		

Table 6 - Special Dates

VI. Responsibilities & Consequences

Student Responsibilities:

- Attend class and be aware of announcements made in class.
- Work homework problems early enough to seek help if needed.
- Form study groups.
- Get help from tutors, tapes, and/or the instructor.
- Read and know the attendance policy.
- All students are encouraged to implement good hygiene measures such as washing hands regularly, using hand sanitizer, and covering coughs/sneezes. Hand sanitizing stations are available across all SPC locations.
- **** Please, *turn off cell phones and pagers during class!* ****
    - **If the instructor determines that activation of a cell phone, pager, PDA, Ipod, laptop, or any electronic device interrupts the lecture or classroom discussion or impedes the progress of any student then the instructor may ask the student to leave the class temporarily or permanently.**
    - **No technologic devices such as cell phones, PDA's, etc. are to be used during tests.**
- **Follow the classroom policy, no food or drink allowed in the classroom if posted.**
- **In addition to the No Food or Drink classroom policy and in accordance to campus policy, no tobacco products are to be permitted and consumed in class.**
- **Do not dress for the beach or for bed.**
- **You will obtain your final grade for the class through Texan Connect &/or Colleague.**

Cell Phone Policy:

All students will, during each class period and for its duration, place and keep their cell phone in its deactivated state, provided that they are at the present time in possession of said device, face-down in the right-hand corner and on the top surface of their desk unless the cell phone is used as a laptop function. If a student's cell phone activates and/or the student engages in text messaging during class at anytime during the semester, the student, by the instructor's discretion, could be permanently dismissed from the class for the remainder of the semester. If a student's cell is activated during class and/or the student engages in text messaging determined by the instructor, and **the student chose not to place their phone on top of their desk as mentioned above** then the student will be dismissed from the class by the instructor permanently.

Academic Integrity:

The attempt of any student to present as his or her own any work which he or she has not honestly performed is regarded by the faculty and administration as a serious offense and renders the offender liable to serious consequences, possibly suspension. For more detail, see "Academic Integrity" and "Student Conduct" in the South Plains College General Catalog.

You are expected to work alone on all quizzes and tests. You are not allowed to use any electronic device other than your calculator during a quiz or test. If you choose to cheat, you will be withdrawn immediately from this class with a grade of "F."

Academic Misconduct:

Complete honesty is required from students in all facets of course work including homework assignments, tests, and the final exam. See the South Plains College Catalog for more detail.

Sanctions for Cheating or Plagiarizing:

A grade of "F" in the course will be assigned to any student caught cheating or plagiarizing; additional sanctions may also be considered. Students are responsible for understanding the meanings of the words cheating and plagiarizing.

VII. Questions:

I invite all your questions **except** the following:

1. I wasn't able to make it to class. Did I miss anything? (Yes.)
2. Is this going to be on the test? (Perhaps, not directly, but if the ideas were not important, I would not be discussing them in class.)
3. Do you have the test graded? (I normally have the tests graded by the next class day. However, there are times that I do not have them graded but I will have them graded as soon as I can.)

Verified Extenuating Circumstances

Death in the family, hospitalization, +COVID test, etc. with written proof.

VIII. Objectives:

Course Objectives: Upon completion of this course and receiving a passing grade, the student will have mastered at least 70% of the course objectives. The course objectives state that the student will be able to:

a.) Perform arithmetic with complex numbers
b.) Solve quadratic equations
c.) Solve linear and absolute value inequalities
d.) Solve quadratic and rational inequalities
e.) Graph relations and functions (polynomial & rational)
f.) Find the zeros, asymptotes and domains of polynomial and rational functions
g.) Use exponential properties to solve exponential equations
h.) Use the properties of logarithms to solve logarithmic equations
i.) Solve systems of linear equations using substitution, elimination and graphing
j.) Solve systems of nonlinear equations using substitution
k.) Solve linear systems using matrices
l.) Use matrix operations to solve matrix equations
m.) Determine the inverse of a square matrix
n.) Find the determinant of a matrix.
o.) Apply midpoint, distance, and circle formulas
p.) Use the Binomial Theorem to expand binomials of higher degree

IX. SPC Policies & Procedures

A. Diversity:

In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world, and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

B. Disability Statement:

Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Special Services Office, preferably, early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Special Services Coordinator. For more information, call or visit the Special Services Office in the Student Services Building, 894-9611 ext. 2529.

C. Nondiscrimination Policy:

South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

D. Sexual Misconduct:

It is important for you to know that all faculty members are mandated reporters of any incidents of sexual misconduct. That means that I cannot keep information about sexual misconduct confidential if you share that information with me. Dr. Lynne Cleavinger, the Director of Health & Wellness, can advise you confidentially as can any counselor in the Health & Wellness Center. They can also help you access other resources on campus and in the local community. You can reach Dr. Cleavinger at 716-2563 or lcleavinger@southplainscollege.edu or go by the Health and Wellness Center. You can schedule an appointment with a counselor by calling 716-2529.

E. Title IX Pregnancy Accommodations Statement:

If you are pregnant, or have given birth within six months, Under Title IX you have a right to reasonable accommodations to help continue your education. To activate accommodations you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Director of Health and Wellness. Once approved, notification will be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact the Director of Health and Wellness at 806-716-2362 or email cgilster@southplainscollege.edu for assistance.

F. Campus Concealed Carry:

Campus Concealed Carry - Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and South Plains College policy, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to the SPC policy at: (http://www.southplainscollege.edu/human_resources/policy_procedure/hhc.php)
Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716-2396 or 9-1-1.

X. Course Outline

Week	Date	Topics and Sections Covered
		STEM Course Outline This schedule is tentative and subjective to change. Changes will be announced in class.
Week	**Date**	**Topics and Sections Covered**
1	8/26, Mon	**ASSESSMENT TEST** Number System Set Notation & Set Theory P.1 Real Number System & Algebra Properties P.2 Scientific Notation Factoring – Common Factors
	8/28, Wed	8.5 Binomial Theorem Factoring – Trinomials, Special Products, & GCF
2	*9/2, Mon*	*MLK, Jr.*
	9/4, Wed	1.4 Complex Numbers P.5 Factoring (Review) – GCF, Factor by Grouping, & Special Products
3	9/9, Mon	1.2 Linear & Rational Equations 5.1 Systems of Linear Equations in Two Variables 1.3 Models & Applications Factoring contd.
	9/11, Wed	1.5 Quadratic Equations (Complete the Square included) and Applications of Quadratic Equations
4	9/16, Mon	1.6 Other Types of Equations
	9/18, Wed	1.7 Linear & Absolute Value Inequalities 3.6 Polynomial & Rational Inequalities
5	9/23, Mon	*2.3 Linear Functions (Lines) & Slope* *2.4 More on Slope* *2.8 Distance & Midpoint Formulas* *Linear Regression*
	9/25, Wed	**TEST 1 (Equations)**
6	9/30, Mon	2.1 Basics of Functions 2.2 More on Functions & their Graphs
	10/2, Wed	1.3 Literal Equations 3.7 Modeling Using Variation
7	10/7, Mon	2.6 Composition of Function 2.7 Inverse of Functions
	10/9, Wed	*3.1 Quadratic Functions* *7.3 Parabola*
8	10/14, Mon	**TEST 2 (Functions)**
	10/16, Wed	3.2 Polynomial Functions & their Graphs 2.5 Transformations of Functions 3.3 Dividing Polynomials: Remainder and Factor Theorem
	10/18, Fri	*Fall Break*
9	10/21, Mon	3.4 Zeros of Polynomial Functions 7.1 Ellipse 2.8 Circles
	10/23, Wed	3.5 Rational Functions & Their Graphs 7.2 Hyperbola 5.4 Systems of Nonlinear Equations in Two Variables
10	10/28, Mon	*4.1 Exponential Functions* *4.2 Logarithmic Functions*
	10/30, Wed	**TEST 3 (Polynomial & Rational Functions and Conics)**
11	11/4, Mon	4.3 Properties of Logarithms 4.4 Exponential & Logarithmic Equations 4.5 Exponential Growth & Decay: Modeling Data (Half-life & Newton's Law of Cooling)
	11/6, Wed	6.1 Matrix Solutions to Linear Systems (GJE) 6.5 Determinants & Cramer's Rules

Table 7 - Course Outline

12	11/11, Mon	6.2 Inconsistent & Dependent Systems & their Applications Non-Square Systems
	11/13, Wed	Applications of Systems of Equations
13	11/18, Mon	5.3 Partial Fractions
	11/20, Wed	5.5 *Systems of Inequalities* 5.6 *Linear Programming (Simplex Method)*
14	11/25, Mon	**TEST 4 (Exponential & Logarithmic Functions and Systems of Equations)**
	11/27, Wed	*Thanksgiving*
15	12/2, Mon	8.1 Sequences 8.2 Arithmetic Sequences
	12/4, Wed	8.3 Geometric Sequences 8.4 Mathematical Induction (Probability, Vectors, Logic – Truth Tables, Graph Theory)
Finals	12/9, Mon	*FINAL EXAM: 8 – 10am*

Table 8 - Course Outline contd.

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ACKNOWLEDGMENTS

I owe a debt of gratitude to Charlene Perez, Professor of CIS, at South Plains College for tolerating my incessant number of questions and ideas all the while being at my occasional disposal during the semester I attended BCIS 1305 – Business Computer Applications which primarily aided in the shape and refinement of this syllabus in terms of all its bells and whistles.