MATH 2415 (4:3:2)

CALCULUS III

MATHEMATICS DEPARTMENT

Division of Arts & Sciences

South Plains College

SPRING 2026

Shirley Davis

Table of Contents

Table of Figures

"Of all the intellectual hurdles which the human mind has confronted and has overcome in the last fifteen hundred years the one which seems to have been the most amazing in character and the most stupendous in the scope of its consequences is the one relating to the problem of motion."

— Herbert Butterfield

MATH 2415 – Calculus III

Section 001, M W 8:30 – 10:35 am

Math Bldg., Rm. 105

I. Instructor Info

A. Instructor:

1.) **Professor:** Miss S. Davis
2.) **Office:** 103 MATH Bldg.
3.) **Phone:** (806) 716 – 2699
4.) **E-mail address:** sdavis@SouthPlainsCollege.edu

- SPC email address
- Not Bb email address

a.) Any questions or comments should be sent using **Blackboard email** (i.e., Course Messages) not your SPC email. SPC email will be used as a secondary communication tool.

b.) **Response Times**

I will do my best to respond to your email within the primary office hour availability zone posted on Blackboard. If the emails are overwhelming in volume then please allow me 72 hours = 3 business days of receipt Monday through Thursday throughout the regular business day Monday through Thursday to respond to your email. If I do not respond within 72 hours please email again. Response times are dependent on whether my proposed method of emailing is respectively followed. In other words, if you decline to follow my instructions for emailing me through Blackboard and email me through my SPC email account then response times could take weeks.

5.) **Messaging/Announcements:** **Blackboard email** and postings will be used as our primary virtual means of communication. **SPC Email will be used as a secondary communication instrument since student emails can be overwhelmed by administrative emails.** Your course will be contained within Blackboard. The instructor will post general announcements in Blackboard.

You must check Blackboard homepage on a regular basis preferably daily.

B. Office Hours:

Table 1 - Office Hours

Monday	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
8 – 8:30am *10:35 – 11am* *2:15 – 3:45pm*	*2:15 – 3:45pm*	*10:35 – 11am* *2:15 – 3:45pm*	*2:15 – 3:15pm*	*1 hour* *(Designated time posted weekly)*
or by appointment				
At these designated times, I will be available in my office 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.				

II. Course Info

A. Course Description: Parametric equations and polar coordinates, functions, derivatives, & integrals; vector analysis; quadrics & surfaces functions and graphs; multivariable functions, partial derivatives, & their applications; multiple integration in rectangular, polar, cylindrical, & spherical coordinates with application; Jacobian; and vector fields analysis including Green's & Stoke's Theorem.

B. Text: Calculus, 10th edition by Larson & Edwards **(ISBN: 978-1-285-05709-5)**

C. Supplies: Computer access, Computer laptop (recommended), large 3-ring notebook binder, dividers, notebook paper, hole punch, stapler, a staple puller, pencils, erasers, a ruler, scientific calculator (preferably a TI-85 or higher).

D. Purpose: To provide a transferable course in Calculus III, to lay a foundation for the study of Differential Equations, and other more advanced mathematics &/or engineering courses.

E. Prerequisites: MATH 2414 (Calculus II) and, strategically, Analytical Geometry

Return to Table of Contents

III. Attendance Policy

A. 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. Maintaining a time management schedule for the online video lectures is crucial to avoid lagging in this class. 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.

B. Withdrawal:

If you wish to withdraw yourself from this class for any reason, you must initiate the appropriate steps on your own.

IV. Equipment

A. Online Essentials:

1.) Internet access
- Working, reliable internet access with the ability to participating in online conferences via Blackboard or Zoom.
- 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 **Cal 3 Blackboard**. 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 **Cal 3 Blackboard** 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.

4.) Calculator
- You will need a scientific calculator for this course.
- Recommended: TI-89 Titanium (for STEM majors) or TI-92.
- 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 video lectures, 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.

Return to Table of Contents

V. Coursework Policies

A. Assignments:

Homework will be assigned for each class meeting (**located on Cal 3 Bb**). You are expected to work all problems assigned in each assignment and to seek help when you do not understand. You are responsible for keeping up to date and prepared. Homework is to be completed and be kept in a notebook that must accompany you to each (f2f) class session. Late homework is not accepted.

B. Assessments:

There will be quizzes given over the assigned homework in which no make-ups will be allowed. The total number of quizzes for the semester is unpredictable (unknown number at this moment) but only a portion will count as the quiz grade (implying the few lowest will be dropped).

C. Tests:

There will be four tests (possibly five) and a comprehensive final exam. Exams will be f2f unless there exist **verified extenuating circumstances** in which the exams will be conducted online through Zoom meetings. Zoom invitations will be delivered through Blackboard via announcements and/or Bb email on or before exam days.
If the final exam score is greater than any non-zero major exam score then the final exam score replaces the major exam score. In other words, the 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.

1.) **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.

D. Maximizing Potential

1.) Login to Blackboard daily;
2.) Attend each face-to-face class session;
3.) Practice the exercises in each lesson until you have full mastery of them;
4.) Complete each set of homework exercises;
5.) Complete each quiz; and
6.) Complete each Unit Test.

E. Grading Policy:

Your final grade will be based solely on major exam scores, quiz average, notebook score (homework average), and a comprehensive final.

1.) **Grading Score:** $\text{Final score} = \frac{\text{Test 1} + \text{Test 2} + \text{Test 3} + \text{Quiz Average} + \text{Notebook Score} + \text{Final Exam score}}{6}$

NOTE: If the final exam score is greater than the least non-zero major exam score (excluding the Notebook score & Quiz average) 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.

2.) **Grade Scale:**

Table 2 - Grading Scale

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

3.) **Borderline Grades:** These grades will be evaluated with regard to attendance and mature conduct in class.

4.) **Blackboard Gradebook:** Your grades will be accessible in **Cal 3 Bb** Gradebook. However, I consider Bb Gradebook the UNOFFICIAL grade because, at any time, it may not contain all your grades for the course. For your final score in this course, you will obtain at the end of the semester **through Texan Connect &/or Colleague.**

Return to Table of Contents

F. STUDY: **You should normally spend approximately 2-3 hours outside of class in 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.**

1.) **Methods of Learning Assessment:**

a.) **Handwritten notes for video lectures.** This helps both of us to be diligent in keeping your skills on pace.

2.) **Organization:**

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 following material will be placed in the notebook in the order listed:

a.) Cover sheet including Name, Class, and Semester,	f.) Work,
b.) Syllabus,	g.) Quizzes,
c.) Procedure pages,	h.) Tests, &
d.) Assignment sheet,	i.) Miscellaneous
e.) Notes,	

Table 3 - Notebook Material

(1.) *To print all the material for your notebook, please visit the the **Cal 3 Bb** page. All printed material needs to be read at least once during the term of this course.*

3.) **Tutoring:** Free tutoring is available in the Math-Engineering building (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 **Cal 3 Bb**.

4.) **Video Tapes:**

Video Review Recordings for many topics in this course are available at the following web address
College Algebra: http://www.youtube.com/playlist?list=PLXbDWrtfFWZFyJsxoTSmTO_0J7vBDTuRy
Analytical Geometry: http://www.youtube.com/playlist?list=PLXbDWrtfFWZGwa3ES0fuMGOJ0EgEtO3DE
All other mathematical topics: https://www.youtube.com/@SPCMathVideos/videos

Table 4 - Video Recordings of Prerequisites

Tape	Topic
	Analytical Geometry
310	Parabolas
320	Ellipses
325	Hyperbolas
	Parametric Equations
335	Polar coordinates
	Calculus III
85	Double Integration
490	Double Integration with Polar Equations

G. Critical Dates:

Table 5 - Special Dates

Jan 19	Martin Luther King, Jr. Day	*April 10*	**WEB Pre-registration for Fall, Spring Interim, & Summer 2026**
March 16 – 20	Spring Break	**Final Exams**	
April 3	EASTER	*May 4 be with you!*	*(10:15a – 12:15p, Monday)*
April 30	Last Day to Drop		

Return to Table of Contents

VI. Responsibilities & Consequences

A. Student Responsibilities:

1.) Attend class, be aware of announcements made in class and on Blackboard, and ask questions when necessary.
2.) Work homework problems early enough to seek help if needed.
3.) Form study groups.
4.) Work extra problems as required to understand each topic.
5.) 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.
6.) ***Cell phones, laptops, and pagers during class!* ****
   a.) Cell phones and laptops are required to use in class in order to upload class work documents.
      (1.) If the instructor determines that activation of a cell phone, pager, PDA, or laptop irrespectively interrupts the lecture or classroom discussion or impedes the progress of any student then the instructor will ask the student to leave either temporarily or permanently.
      (2.) **No technologic devices such as cell phones, PDA's, etc. are to be used during tests or in-class quizzes but, at the instructor's discretion, may be used at the completion of tests and/or in-class quizzes. If due to technological disruption, the instructor may grant permission for a student(s) to use such devices for a test or in-class quiz.**
7.) **Follow the classroom policy, no food or drink allowed in the classroom if posted (located in DE Blackboard, under SUPPLEMENTARY category and tab, *Notebook Material*).**
8.) **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.**
9.) **You will obtain your final grade for the class through Texan Connect &/or Colleague.**

B. 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.

C. 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.

1.) 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."

D. 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.

E. 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. (Refer to page 9 of the syllabus for specific details of the definitions of cheating and plagiarizing.)

Return to Table of Contents

VII. Questions:

A. 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 tests graded? (I put forth my best effort to have the tests graded so as to return them the next class session. However, there are times due to uncontrollable factors that this may not be possible.)

B. Verified Extenuating Circumstances

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

VIII. Objectives:

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

1.) Describe graphically and interpret parametric, conic, and polar equations. (The use of a graphing calculator is required).

2.) Calculate the derivatives & antiderivatives of parametric and polar equations and solve applications such as maximum & minimum stated problems as well as area and solids of revolutions of parametric and polar equations.

3.) Use vector analysis to perform operations on vectors such as the Dot and Cross products and write equations of lines & planes in space.

4.) Work vector-valued functions and motion in space (TNB frame).

5.) Describe surfaces in space, their maximum, minimum, and level curves.

6.) Analyze and apply concepts of continuity and differentiation (partial derivatives) to multivariable functions and find their limits, directional derivatives, and gradients.

7.) Apply the derivative rules to optimize multivariable functions.

8.) Evaluate area, volumes, surface area, and arc length by double and/or triple integration.

9.) Apply the concepts of multiple integrals to solve application problems.

Return to Table of Contents

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 should notify the Disability Services Office 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 Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Lubbock Centers (located at the Lubbock Downtown Center) 806-716-4675, or Plainview Center (Main Office) 806-716-4302.

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.

Return to Table of Contents

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 parenting (paternal or maternal) with children under the age of 18 per **Texas Education Code 51.982 and** Title IX you have a right to reasonable accommodations to help continue your education. To activate accommodations you must submit a **Title IX pregnancy and parenting accommodations request**, along with specific medical documentation, to the Health and Wellness Center. 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 Health and Wellness Center at 806-716-2529 or email **rcanon@southplainscollege.edu** for assistance.

F. Campus Concealed Carry:

Texas 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 and Frequently Asked Questions, please refer to the Campus Carry page at: http://www.southplainscollege.edu/campuscarry.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.

G. AI use: Artificial Intelligence (AI) Policy

Return to Table of Contents

X. Course Outline

Table 6 - Course Outline

			Cal III Course Outline This schedule is tentative and subjective to change. Changes will be announced in class.
Week			**Topics and Sections Covered**
1	1/12, Mon	Lesson 1	Introduction Review: Parametric Equations – Graphing
	1/14, Wed	Lesson 2	Review: Parametric Equations – Graphing, Derivatives and Tangents, Relative Extrema, Area, Volume, Arc Length, Surface Area, & Centroids
2	***1/19, Mon***		***Martin Luther King, Jr. Day***
	1/21, Wed	Lesson 3	11.1 Vectors Trigonometric (Polar) Form of Complex Numbers 11.2 Vectors in Space
3	1/26, Mon	Lesson 4	11.3 Dot Product 11.4 Cross Product
	1/28, Wed	Lesson 5	Resultant Vectors
4	2/2, Mon	Lesson 6	11.5 Lines and Planes in Space
	2/4, Wed	Lesson 7	12.1 *Vector-Valued Functions* 12.2 *Vector-Valued Functions – Calculus* 12.3 *Velocity & Acceleration*
5	**2/9, Mon**		**TEST 1 (Vectors, Ch 11)**
	2/11, Wed	Lesson 8	12.3 Velocity & Acceleration contd. 12.4 Tangent & Normal Vectors (AcceleraTioN)
6	2/16, Mon	Lesson 9	12.4 Tangent & Normal Vectors (AcceleraTioN) contd. 12.5 Arc Length & **Curvature**
	2/18, Wed	Lesson 10	12.5 Curvature Contd. (Torsion & TNB frame) 11.6 Surfaces in Space (Cylinders and Quadric Surfaces) Space Coordinates & Surface of Revolution
7	2/23, Mon	Lesson 11	Review: Polar Equations – Coordinates, Equations, and Graphing 11.7 Cylindrical and Spherical Coordinates Review: Conic Sections and Quadratic Equations – Parabolas, Ellipses, & Hyperbolas
			TEST 2 (Vector-Valued Functions, Ch 12)
	2/25, Wed	Lesson 12	13.1 Functions of Several Variables 13.3 Partial Derivatives 13.5 The Chain Rule: Implicit Differentiation (only) 13.6 Directional Derivatives & Gradients
8	3/2, Mon	Lesson 13	13.6 Directional Derivatives & Gradients contd. 13.7 Tangent Planes & Normal Lines
	3/4, Wed	Lesson 14	13.8 Extrema of Functions of Several Variables 13.9 Applications of Extrema of Multivariable Functions
9	3/9, Mon	Lesson 15	13.9 Applications of Extrema of Multivariable Functions contd. 13.10 Lagrange Multipliers
	3/11, Wed	Lesson 16	14.1 *Area in the Plane (Double Integrals)* 14.2 *Double Integrals & Volume* 14.3 *Polar Coordinates – Double Integrals*
	3/16 – 3/20		***Spring Break***
10	**3/23, Mon**		**TEST 3 (Multi-Variable Functions, Ch 13)**
	3/25, Wed	Lesson 17	14.3 Polar Coordinates – Double Integrals contd. 14.4 Centers of Mass & Moments of Inertia

Return to Table of Contents

			Cal III Course Outline contd. This schedule is tentative and subjective to change. Changes will be announced in class.	
Week			**Topics and Sections Covered**	
11	3/30, Mon	Lesson 18	14.6 Triple Integrals in Rectangular Coordinates 14.7 Triple Integrals in Cylindrical and Spherical Coordinates	
	4/1, Wed	Lesson 19	14.8 Jacobian 14.5 Surface Area	
	4/3, Fri		***Easter Holiday***	
12	4/6, Mon	Lesson 20	15.1 *Vector Fields*	
	4/8, Wed		**TEST 4 (Multiple Integration, Ch 14)**	
13	4/13, Mon	Lesson 21	15.2 Line Integrals	
	4/15, Wed	Lesson 22	15.3 Conservative Vector Fields & Independence of Path	
14	4/20, Mon	Lesson 23	15.4 Green's Theorem	
	4/22, Wed	Lesson 24	15.5 Parametric Surfaces	
	4/24, Fri		**UIL** – No office hours	
15	4/27, Mon	Lesson 25	15.6 Surface Integrals	
	4/29, Wed	Lesson 26	15.7 Divergence Theorem 15.8 Stoke's Theorem	
16	**5/4, Mon**		***FINAL EXAM:***	**8 – 10 a**

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Return to Table of Contents

Index

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 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.

Return to Table of Contents