

South Plains College
Common Course Syllabus: MATH 2320
Revised July 2023

Department: Mathematics, Engineering, and Computer Science

Discipline: Mathematics

Course Number: MATH 2320

Course Title: Differential Equations

Available Formats: conventional

Campuses: Levelland

Course Description: Ordinary differential equations, including linear equations, systems of equations, equations with variable coefficients, existence and uniqueness of solutions, series solutions, singular points, transform methods, and boundary value problems; application of differential equations to real-world problems.

Prerequisite: Successful completion with a grade of 'C' or better in MATH 2414.

Credit: 3 **Lecture:** 3 **Lab:** 0

Textbook: None; Instructor will provide resources via Blackboard

Supplies: Non-graphing calculators are *preferred* for this Course; graphing calculators are permitted, but unnecessary; writing surfaces and utensils are must-haves

This course partially satisfies a Core Curriculum Requirement: None

Core Curriculum Objectives addressed:

- **Communications skills**—to include effective written, oral and visual communication
- **Critical thinking skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **Empirical and quantitative competency skills**—to manipulate and analyze numerical data or observable facts resulting in informed conclusions

Student Learning Outcomes: Upon completion of this course and receiving a passing grade, the student will be able to:

1. Identify homogeneous equations, homogeneous equations with constant coefficients, and exact and linear differential equations.
 - a. Section 4.3: Linear Equations with Constant Coefficients
2. Solve ordinary differential equations and systems of equations using:
 - a. Direct integration [Chapter 1: Introduction to Differential Equations]
 - b. Separation of variables [Section 2.2: Separable Equations]
 - c. Reduction of order [Section 4.2: Reduction of Order]
 - d. Methods of undetermined coefficients and variation of parameters
 - i. Section 4.4: Underdetermined Coefficients—Superposition Approach
 - ii. Section 4.5: Underdetermined Coefficients—Annihilator Approach
 - iii. Section 4.6: Variation of Parameters
 - e. Series solutions [Chapter 6: Series Solutions of Linear Equations]
 - f. Operator methods for finding particular solutions
 - i. Section 4.1: Preliminary Theory – Linear Equations
 - ii. Section 7.3: [Laplace] Operational Properties I
 - iii. Section 7.4: [Laplace] Operational Properties II
 - iv. Section 8.3: Nonhomogeneous Linear Systems
 - g. Laplace transform methods
 - i. Section 7.1: Definition of the Laplace Transform
 - ii. Section 7.2: Inverse Transforms and Transforms of Derivatives
3. Determine particular solutions to differential equations with given boundary conditions or initial conditions.
 - a. Section 4.1: Preliminary Theory – Linear Equations
 - b. Section 5.1: Linear Models: Initial-Value Problems
 - c. Section 5.2: Linear Models: Boundary-Value Problems
4. Analyze real-world problems in fields such as Biology, Chemistry, Economics, Engineering, and Physics, including problems related to population dynamics, mixtures, growth and decay, heating and cooling, electronic circuits, and Newtonian mechanics.
 - a. Section 1.3: Differential Equations as Mathematical Models
 - b. Section 3.1: Linear Models
 - c. Various Section Exercises

Student Learning Outcomes Assessment: A pre- and post-test questions will be used to determine the extent of improvement that the students have gained during the semester

Course Evaluation: There will be departmental final exam questions given by all instructors.

Attendance/Student Engagement Policy: Attendance and engagement are the most critical 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 may remove the student from the class with an X, upon their discretion, to help the student from harming their GPA. If the student can not receive an X, the instructor will assign an F.

Plagiarism violations include, but are not limited to, the following:

1. Turning in a paper that has been purchased, borrowed, or downloaded from another student, an online term paper site, or a mail order term paper mill;
2. Cutting and pasting together information from books, articles, other papers, or online sites without providing proper documentation;
3. Using direct quotations (three or more words) from a source without showing them to be direct quotations and citing them; or
4. Missing in-text citations.

Cheating violations include, but are not limited to, the following:

1. Obtaining an examination by stealing or collusion;
2. Discovering the content of an examination before it is given;
3. Using an unauthorized source of information (notes, textbook, text messaging, internet, apps) during an examination, quiz, or homework assignment;
4. Entering an office or building to obtain an unfair advantage;
5. Taking an examination for another;
6. Altering grade records;
7. Copying another's work during an examination or on a homework assignment;
8. Rewriting another student's work in Peer Editing so that the writing is no longer the original student's;
9. Taking pictures of a test, test answers, or someone else's paper.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect from the student and the instructor. Neither the instructor nor the student should be subject to others' rude, disruptive, intimidating, aggressive, or demeaning behavior. Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

For information regarding official South Plains College statements about intellectual exchange, disabilities, non-discrimination, Title IX Pregnancy Accommodations, CARE Team, and Campus Concealed Carry, please visit <https://www.southplainscollege.edu/syllabusstatements/>.

South Plains College policies, return to campus plan, and protocols regarding COVID-19 can be found here: <https://www.southplainscollege.edu/emergency/covid19-faq.php>.

SPC Bookstore Price Match Guarantee Policy: If you find a lower price on a textbook, the South Plains College bookstore will match that price. The difference will be given to the student on a bookstore gift certificate! The gift certificate can be spent on anything in the store.

If students have already purchased textbooks and then find a better price later, the South Plains College bookstore will price match through the first week of the semester. The student must have a copy of the receipt and the book has to be in stock at the competition at the time of the price match.

The South Plains College bookstore will happily price match BN.com & books on Amazon noted as *ships from and sold by Amazon.com*. Online marketplaces such as *Other Sellers* on Amazon, Amazon's Warehouse Deals, *fulfilled by Amazon*, BN.com Marketplace, and peer-to-peer pricing are not eligible. They will price match the exact textbook, in the same edition and format, including all accompanying materials, like workbooks and CDs.

A textbook is only eligible for price match if it is in stock on a competitor's website at time of the price match request. Additional membership discounts and offers cannot be applied to the student's refund.

Price matching is only available on in-store purchases. Digital books, access codes sold via publisher sites, rentals and special orders are not eligible. Only one price match per title per customer is allowed.

Note: The instructor reserves the right to modify the course syllabus and policies, as well as notify students of any changes, at any point during the semester.

MATH 2413—Calculus I
South Plains College, Levelland Campus
Spring Semester 2024

Sections: 002, TR, 1:00 – 3:05 PM [Face-to-Face]

Room: Levelland Agriculture Building, Room 103

Instructor: Mr. Robert E. Plant, II, M.S.

Office Info: Room—Levelland Math Bldg. 116B

Phone—(806) 716-2734

Hours—the following table will display the regular office hours.

Monday	Tuesday	Wednesday	Thursday	Friday (Flex)
14:30 – 15:30 (LL)	8:30 – 9:15	14:30 – 15:30 (LL)	8:30 – 9:15	9:00 – 11:00
16:45 – 17:15 (DT)	15:15 – 16:30	16:45 – 17:15 (DT)	15:15 – 16:30	
OR BY APPOINTMENT: Virtual Office Hours				

E-mail: rplant@southplainscollege.edu

O.P.I.*: This syllabus is © 2024 by Mr. Robert E. Plant, II

* O.P. I. means “other pertinent information,” or in layman terms, “something else that you need to know.”

Tutoring: Tutoring is FREE for all currently enrolled students. Make an appointment or drop-in for help at any SPC location or online! Visit the [SPC Tutoring Webpage](#) to learn more about how to book an appointment, view the tutoring schedule, and view tutoring locations.

You also have 180 FREE minutes of tutoring with Tutor.com each week, and your hours reset every Monday morning. Log into Blackboard, then click on the tools option from the left-hand menu bar. Click on the “Tutor.com” link, and you will automatically be logged in for free tutoring.

You may access the Tutor.com tutors during the following times:

Monday – Thursday: 8pm-8am OR 6pm Friday – 8am Monday morning

For questions regarding tutoring, please email [SPC Tutoring](#) or call 806-716-2538.

“You must go through TSA to pass: Think, Speak, and Act accordingly...”

—Instructor

Expectations of the Student for the Instructor

The Student is within all rights to expect that the Instructor do the following:

- Show up, as scheduled, and mutually agreed upon, to teach all information pertaining to the course.
- Use the entirety of the lecture period, physical or virtual, as well as the allotted lab time for this course.
- Provide notice of any schedule changes.
- Maximize the time allotted for this course by assessing student aptitude of covered information when time permits.
- Present the material in a manner that can generally be understood by the class at large.
- Be accessible to those who need assistance outside of the classroom setting, by way of e-mail or in person, during office hours or reasonably scheduled appointment times.
- Respond to all contact attempts in a timely and discretionary manner.
- Hold to any assignment(s) given over the semester unless removed.
- Uphold the policies of the college as it pertains to the student's welfare in the course.
- Not make any exceptions regarding the dismissal of any student from the course for reasons listed herein.
- Allow each student the opportunity to discuss the material presented during the lecture period.
- Provide examinations based on the information discussed in class that contain problems which use solving methods *like* those assigned from sections pertaining to the exam.

Expectations of the Instructor for the Student

The Instructor is within all rights to expect that the Student do the following:

- Show up, as scheduled, and mutually agreed upon, to receive and learn all information pertinent to the course and be mindful of any schedule changes.
- Take advantage of *all* resources available to you. These resources, which include the Office Hours and the Tutoring Lab, have been previously stated in the syllabus.
- Be respectful of your peers and the Instructor as stated in the SPC Student Handbook.
 - In the collegiate setting, all students are considered adults and are expected to uphold conduct worthy of such consideration.
 - Failure to do so provides enough grounds for the Student to be dismissed from the course.
- Be willing to work with—**BUT NOT DO WORK FOR**—fellow classmates.
 - Networking is an essential tool both in the workforce and in the classroom; furthermore, the greater the numbers of minds there are involved, the less mental labor is required for everyone.
 - Virtual networking will very much be a necessity. Use Skype, Teams, or other virtual conferencing interfaces to interact with each other (when permitted).
 - No one is an island... **except on the exams!**
- Be mindful of the classroom setting and the roles therein.
 - While student tuition is vital to the well-being of this academic institution, this does NOT warrant the concession of any instructor to you in a manner that compromises the integrity of the classroom setting and that of the institution itself.
- **Write all graded work legibly. All work not understood by me will not be accepted by me and will cause you to receive a grade of zero percent (0%) for the work in question.**
- Turn all electronic devices **off** that have no use in the face-to-face classroom setting.
 - This means all music players, cellular telephones (or cell phones), etc.

- If a cell phone must be on (family emergencies only), then
 - the Instructor must be notified **before** the beginning of the period and
 - the phone must be put on vibrate mode and placed **screen down** on your desk.
- **Tablets and digital notebooks during face-to-face lecture are permitted.**
- If a disallowed device is in use during an exam, then the grade for said exam will be zero percent (0%).
- Bring all materials needed for the course and refrain from bringing anything that is not needed. This allows you to pay attention to the subject matter only and shows me that you are prepared to learn.
- Obtain all missed information and assignments from a fellow classmate.
 - In the spirit of holding to all course objectives in a manner that warrants personal accountability, I will not relay such information unless necessary.
 - This means that **if there is no documented reason for missing the information, then find your peers, not me.**
- READ THE SYLLABUS!!!
 - If you lose the copy that I give you, then you will have to obtain another copy from Blackboard.
 - There are **no exceptions** to this rule!

Required & Disallowed Materials for the Course

The following materials are required of the Student for this course:

- Writing Utensil—This will be required for all work that is to be graded by the Instructor
 - Pencil is ***strongly recommended***
 - Work that is deemed to be illegible will not be graded
 - Label all assignments by Section and Lecture Date
 - Label all problems Exercise Number
- Ruler—This will be required for the Graphing portion of this course
- Multi-subject Notebook (with at least 5 sections)—This is highly recommended for the Student to keep his/her notes; any writing utensil may be used to take notes, and ***the notebook is to be used in this course only***
- Web Camera—This is required for any quizzes and exams that may be proctored electronically (via Proctorio)
- **Non-graphing calculators**—These are allowed in this course and cannot exceed the quality of a TI-36X Pro or Casio fx-991MS Calculator; no extra calculators are required of the Instructor to provide in the event of the Student not having his/her own
- Syllabus Acknowledgment of Receipt—The filling in, signing, scanning, and submitting of said form is prerequisite for any accommodations stated in the Syllabus to be recognized for the Student; nonetheless, the Student is still expected to uphold any responsibilities that are stated herein
- Cell phone scanning app—These will be used to scan your written work and to save it as a ***single PDF file***; apps include the Phone's Notes app, OneDrive (need SPC email and password), Genius Scan, CamScanner, and Evernote (Scannable [for Apple] or "for Android")

The following materials and situational items are disallowed in this course:

- **Online math answering programs**—Programs that provide "solutions" to unworked problems, such as Chegg, MathWay, PhotoMath, and Wolfram Alpha are strictly prohibited from use in this course
 - First Offense—50% penalty on assignment
 - Second Offense—Student may be dropped from the course
- Graphing calculators—As most professional examinations have disallowed the use of graphing calculators, the Instructor has chosen to remove such calculators from use in this Course; cell phone calculator usage is also disallowed; repeated violation will result in the ***dismissal of the Student from the course***
- Notes on exams—Use thereof in said circumstance that is not permitted by the Instructor will result in the immediate dismissal of the Student from the course.

If the Student has any concerns pertaining to the information above on this page, then the Student is to contact the instructor by the means stated in this document. The Instructor cannot be reasonably expected to address any such concerns if no communication is had with the Student.

Grading Policy*

90% or above	A	Homework:	3%
80-89%	B	Short outcomes quizzes:	35%
70-79%	C	In-class examinations:	42%
60-69%	D	Final examination:	20%
59% or below	F		

*All grades are rounded from the first decimal. Upon the submission of grades at the end of the semester, **ALL GRADES ARE FINAL!**

Assignment Breakdown

Homework and Notes—Students will be asked to submit this at the conclusion of each Exam Unit with contents including the following:

1. Homework Exercises
2. “Bone Collection”: hints given during lecture

Quizzes—Students will be assessed eight (8) times over the lecture material; these will be proctored *in person* and scanned upon completion; *written* notes and homework exercises will be allowed for use (55-minute duration)

Midterm Examinations—Students will be assessed over each unit upon the calendar-determined completion thereof; these will be proctored *in person* and scanned upon completion; ***no notes or exercises will be allowed*** (125-minute duration)

Final Exam—Students will be given a comprehensive Final Exam at the end of the Semester, which will be proctored *in person*, COVID-permitting (see Calendar)

Holiday/Travel Statement

If you the student have pre-existing plans to either travel out of the area during scheduled class times, you must inform me by **NO LATER THAN Monday, February 5, 2024**. Failure to do so will result in the forfeiture of any assignments that will come into question during your dates of absence.

Religious Holy Days

In accordance with Section 51.911, Texas Education Code, South Plains College will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within seven (7) calendar days after the absence. Students are required to file a written notification of absence with each instructor within the **first fifteen (15) days of the semester** in which the absence will occur. Forms for this purpose are available in the Student Services Office along with instructions and procedures. “Religious holy days” means a holy day observed by a religion whose place of worship is exempt from property taxation under Section 11.20, Tax Code. (Copied from current South Plains College Catalog)

Proctored Assessment Policy (As Necessary)

- If a Student has a **detached webcam**, which is built separately from the proctoring device (laptop/notebook/desktop), then the Student should remember this motto: “Face and space keep grades in place.” This means that if I can see **both** the face and workspace of the Student to verify academic integrity, then all will be well with the grading of each Assessment.
- If the Student has an **integrated (built-in) webcam**, then the Student must do the following **before** the Assessment is started: 1) show his/her calculator in the writing hand, then set it down, 2) show his/her phone in the writing hand, 3) place said phone **behind** the proctoring device, which must be placed at an angle and on the opposite side of the writing hand, 4) show the non-writing hand, empty, next to the face in the camera, and 5) place the non-writing hand on the desk and in front of the proctoring device.
- Once the Student has started the Assessment, the proctoring device can neither be adjusted nor obstructed; also, the Student cannot reach behind the proctoring device, and the Student must show his/her hands if not writing or scrolling on the proctoring device.
- Each Assessment must be completed in one sitting. This means that once the Assessment is started, it must be finished.
- The proctored session must last the duration of the Student’s active completion of the Assessment.
- Written work must be turned in 20 minutes after the completion of each Assessment.
- Any Student who fails to comply with the requirements stated above will be suspected of academic dishonesty and will be penalized **no less than 25%** of the Assessment’s stated value. A negative flag rate of 81% or higher on Proctorio will automatically warrant the minimum deduction.

Course Withdrawal Policy

If the Student wishes to withdraw from this class for any reason, then the Student will need to send an email to registrar@southplainscollege.edu from his/her **SPC email** [Email Format, no spaces between: (first initial + last name + last 4 digits of Student ID)@southplainscollege.edu] with the following information:

1. Full Name
2. Birthdate
3. Student ID
4. If they are Dropping or Withdrawing
5. Course(s) Affected
6. Reason for dropping/withdrawing (from) the course.

Sexual Misconduct Confidentiality Statement

As a faculty member, I am deeply invested in the well-being of each student I teach. I am here to assist you with your work in this course. If you come to me with other non-course-related concerns, I will do my best to help. It is important for you to know, however, 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.

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 the Director by phone at 716-2563 or by going to the Health & Wellness Center. You can schedule an appointment with a Counselor by calling 716-2529.

Key SPC Dates

January 15 – MLK Jr Holiday

February 1 – 12th Class Day

March 11-15 – Fall Break

April 5 – Spring Holiday

April 25 – Last Day to Withdraw from Classes

May 6-10 – Finals Week

Mr. Robert E. Plant, II
Spring 2024 Tentative Lecture & Homework Calendar
MATH 2320

Week (Dates)	Part I of Week	Part II of Week
1 (1/15 to 1/19)	MLK, Jr Holiday	Introduction: What Is a DE?
2 (1/22 to 1/26)	1.2	1.3
3 (1/29 to 2/2)	2.2; Quiz 1	2.3
4 (2/5 to 2/9)	2.4	2.5
5 (2/12 to 2/16)	3.1; Quiz 2	Exam 1 Review
6 (2/19 to 10/23)	Exam 1	4.1
7 (2/26 to 3/1)	4.3	4.4; Quiz 3
8 (3/4 to 3/8)	4.5	4.6
3/11 to 3/15	SPRING BREAK – NO CLASSES	
9 (3/18 to 3/22)	5.1, Part I; Quiz 4	5.1, Part II
10 (3/25 to 3/29)	Exam 2	6.1
11 (4/1 to 4/5)	6.2	6.3
12 (4/8 to 4/12)	7.1; Quiz 5	7.2
13 (4/15 to 4/19)	7.3; Quiz 6	8.1, 8.2
14 (4/22 to 4/26)	8.3; Quiz 7	Exam 3 Review
15 (4/29 to 5/3)	Exam 3	Final Exam Review
16 (5/6 to 5/10)	FINAL EXAMINATION SCHEDULE Thursday, 5/9, 10:15 AM – 12:15 PM ORIGINAL CLASSROOM (COVID-permitting)	

* Time Permitting

Mr. Robert E. Plant, II
TENTATIVE HOMEWORK CALENDAR
MATH 2320

Week	Part I of Week	Part II of Week
1 (1/15 to 1/19)	MLK, Jr Holiday	Introduction: What Is a DE?
2 (1/22 to 1/26)	1.2—#1-31 (Odds)	1.3—#1-29 (Odds)
3 (1/29 to 2/2)	2.2—#3-35 (E.O. Odd)	2.3—#1-33 (E.O. Odd)
4 (2/5 to 2/9)	2.4—#1-33 (E.O. Odd)	2.5—#1-29 (Odds)
5 (2/12 to 2/16)	3.1—#1-37 (E.O. Odd)	Exam 1 Review
6 (2/19 to 10/23)	Exam 1	4.1—#1-35 (E.O. Odd)
7 (2/26 to 3/1)	4.3—#3-47 (E.O. Odd)	4.4—#1-41 (E.O. Odd)
8 (3/4 to 3/8)	4.5—#3-71 (E.O. Odd)	4.6—#1-31 (Odds)
3/11 to 3/15	SPRING BREAK – NO CLASSES	
9 (3/18 to 3/22)	5.1—#1-37 (E.O. Odd)	5.1—#41-57 (Odds) BONUS: 5.2—29, 33
10 (3/25 to 3/29)	Exam 2	6.1—#1-37 (E.O. Odd)
11 (4/1 to 4/5)	6.2—#1-23 (Odds)	6.3—#3-31 (E.O. Odd)
12 (4/8 to 4/12)	7.1—#3-39 (E.O. Odd)	7.2—#1-45 (E.O. Odd)
13 (4/15 to 4/19)	7.3—#1-33 (E.O. Odd)	8.1—#1-25 (E.O. Odd) 8.2—#3-47 (E.O. Odd; omit #19)
14 (4/22 to 4/26)	8.3—#1-29 (E.O. Odd)	Exam 3 Review
15 (4/29 to 5/3)	Exam 3	Final Exam Review
16 (5/6 to 5/10)	FINAL EXAMINATION SCHEDULE Thursday, 5/9, 10:15 AM – 12:15 PM ORIGINAL CLASSROOM (COVID-permitting)	

* Time Permitting

E.O. – “Every Other”

HW Notebook Grading Rubric

This is the rubric that will be used for the 3 homework (HW) notebook checks during the semester and the Instructor will hold to this rubric. Each HW notebook check will be graded out of **1 point**. There will be 5 criteria evaluated at each check, with each criterion receiving a standard maximum of 0.2 point:

1. All problems in each section are attempted, or no more than 1 problem is missing for every 10 problems assigned.
 - a. 0.2 point if 90% of problems attempted
 - b. 0.1 point if at least 50% of problems attempted
 - c. 0 points if fewer than 50% of problems attempted
2. All work is shown for each problem, and the Student is using an AUTHORIZED calculator in this course.
 - a. 0.2 points if **all** problems have work shown
 - b. 0.1 point if most problems have work shown
 - c. 0 points if fewer than 50% of problems have work shown OR work is incomplete with an unauthorized calculator
3. HW is organized based on the lecture calendar, is kept in a 3-ringed binder as per the Syllabus, and is grouped based on the mid-term exams.
 - a. 0.2 point if completely satisfied
 - b. 0.1 point if in a folder/notebook OR if out of order
 - c. 0 points if not satisfied
4. HW is made available upon request (on time).
 - a. 0.2 point if completely satisfied
 - b. Prorated deduction for all sections not satisfied
 - c. 50% penalty on entire assignment if one class day late; 100% penalty thereafter*
5. Student correctly applies the information presented in the lecture to HW.
 - a. 0.2 point if completely satisfied
 - b. 0.1 point if not completely satisfied
 - c. 0 points if all sections are not satisfied

* Extenuating circumstances will be handled at the Instructor's discretion as per the Syllabus.

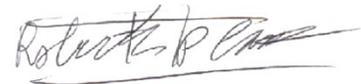
ACKNOWLEDGMENT OF RECEIPT

As a student in this course, I hereby acknowledge that I have received, read, and clearly understood the syllabus. Furthermore, I hold myself accountable for adhering to the expectations stated therein. I also acknowledge that it is my duty and responsibility to notify the instructor of all personal situations that affect my standing in this course before any occur. I am fully aware that any breach of said expectations and responsibilities will result in any necessary consequences that the instructor has stated to me through the syllabus, and that any differences of opinion will be discussed with the instructor in a manner befitting of adults. Finally, in the event of a later dispute by me, I will refer to the syllabus and will, by my signature, forfeit any pursuit that is not backed by the syllabus.

Student's Printed Name

Date of Acknowledgment

Student's Signature



Instructor's Signature

Monday & Wednesday Schedule		Tuesday & Thursday Schedule	
<u>Class</u>	<u>Time</u>	<u>Class</u>	<u>Time</u>

Scan and submit to "Acknowledgment of Receipt Upload" on **Blackboard**.