

MATH 3195-002 **DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA**  
CRN 10800

SPRING 2018

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**Class meets:** Monday and Wednesday 2:00pm – 3:50pm in KING 205

**Office hours:** Tu/Th 12:30pm – 1:30pm or by appointment.

**Prerequisites:** Calculus II (MATH 2411). No co-credit with MATH 3191 or MATH 3200.

**Textbook:** *Differential Equations & Linear Algebra* by C. Henry Edwards and David E. Penney. Pearson Prentice Hall. You can use any edition. I will use the 3<sup>rd</sup> edition for references.

**Course description:** Presents the essential ideas and methods of linear algebra and differential equations, emphasizing the connections between them and the applications of both subjects. The course is designed for students in the sciences and engineering. 4 credits. See *Tentative schedule* below for the list of topics. This course is designed primarily for engineering majors and provides them with essential quantitative tools used throughout STEM disciplines and beyond to create models of change.

**Learning objectives:** After completing this course you should be able to understand the relevance of differential equations to physical and other scientific models; to solve certain classes of differential equations; to understand basic linear algebra topics including vectors, matrices, linear systems, vector spaces, eigenvalues; to use concepts of linear algebra in solving differential equations and systems of equations. The course will enhance your critical and quantitative thinking and problem solving abilities.

**Attendance:** Regular attendance is expected, but is not enforced. You are responsible for learning the material presented in class even in case of absence for any reason.

**Study organization:** Read upcoming sections in the textbook before the class. During the class time participate actively with your questions and answering my questions. There is no need to take notes during the lecture. I will mix lecturing with problem solving. Expect to work in small groups on problems and answer my questions or help me with solving example problems. After class, read relevant sections thoroughly. Lectures are not the substitute for the reading. The breadth and depth of the subject cannot be covered in class – I will be able to highlight only the most important points. It's not possible to learn mathematics (especially applied mathematics) without solving problems. Talk with other students, seek help with me. Expect to spend at least 10 hours a week studying for the class outside the classroom.

**Homework:** I encourage you to do as much of the exercises after the appropriate sections as you can. For each chapter, I will provide a list of suggested problems to solve. Consider it a bare minimum of what you should do to succeed in class. I will not collect or grade homework, but will gladly discuss in class any problems with homework you encounter.

**Weekly quizzes:** Beginning the second week of classes we will start most Wednesday classes (see tentative schedule) with a short quiz of about 2 problems. They will be based on topics discussed in class since the previous quiz or test and might or might not be taken from the suggested textbook exercises. I will inform you of the scope of the quiz at the end of Monday class.

**Project:** You will have to complete a class project, which will involve solving some extended application or application-like problem, possibly with the use of technology. The exact parameters and the timetable will be discussed a few weeks into the course.

**Exams:** There will be 3 midterm exams and a final exam. All in-class midterms and the final are closed books, closed notes, but you will be allowed to bring 1 page of handwritten (by you) notes. No make-up exams will be offered except in the instance of documented medical emergency. If you cannot come to the exam for any other *valid* reason (as determined by me), see me ahead of time to arrange testing for you. The midterms will cover all preceding sections not covered in the previous midterms. Final Exam is comprehensive, it will cover all topics studied in the class.

**Grading:** 3 midterm exams will comprise 50% of the final grade, all quizzes collectively (I will drop the lowest quiz grade) are worth 25% and the final exam is worth 20%. Class project will be worth 5% with another 5% as extra credit. Letter grades will be assigned as follows (rounded up to 0.1%). Minor adjustments (always up, of course) are possible. You will have a chance to earn extra points (up to 5%) for active participation in class, otherwise **no extra credit**.

Percentage grade range	Letter grade
94 – 100	A
90 – 93.9	A-
87 – 89.9	B+
84 – 86.9	B
80 – 83.9	B-
77 – 79.9	C+
70 – 76.9	C
60 – 69.9	D
0 – 59.9	F

**Grade disputes:** 1. Discuss concerns with me. 2. If the issue is not resolved after a conversation with me, discuss concerns with the Department Chair. 3. If the issue is not resolved after a conversation with the Department Chair, discuss concerns with the Associate Dean.

**Incompletes:** Students may be awarded an Incomplete grade, "IW" or "IF", only if the following conditions are satisfied: (1) student successfully completes 75% of course, (2) student has special circumstances that precluded the completion of graded assignments, (3) the missed assignments are to be completed with the original instructor, and (4) course grade is determined using original grade combined with missed assignments. Students who must retake the course and students with poor academic performance are not eligible for an Incomplete. Students making up an incomplete should not re-register for the course. Students who meet criteria for an incomplete are encouraged to complete the CLAS Course Completion Agreement which is available from the CLAS Advising Office, NC 2024. This informal, but important, contract verifies completed assignments, identifies missing assignments, gives current course grade, and stipulates the time frame and other conditions necessary to obtain a letter grade in the course.

**Class website:** Check information on Canvas regularly, at least once a week. Changes to class schedule, announcements, homework assignments, and class materials will be posted on Canvas.

**Courtesy:** Put your cell phones, smartphones and such on silent mode. Any sound or light producing device interfering with your or other's learning process is prohibited. Do not bring pets or children to class. Do not bring food or drink. Follow [\*Student Code of Conduct\*](#).

**Students with disabilities:** are encouraged to contact [Disability Resources and Services Office](#). I will provide all reasonable accommodations for students with disabilities.

**Other:** University policies concerning [academic freedom](#), [integrity](#) (no cheating!), [privacy](#) and [non-discrimination](#) will be scrupulously followed. Changes to the schedule, syllabus, and class rules are possible. They will be announced in class and posted on Canvas.

**Academic Dishonesty:** Students are required to know, understand, and comply with the CU Denver Academic Dishonesty Policy as detailed in the Catalog and on the CLAS website. Academic dishonesty consists of plagiarism, cheating, fabrication and falsification, multiple submission of the same work, misuse of academic materials, and complicity in academic dishonesty. If you are not familiar with the definitions of these offenses, go to <http://www.ucdenver.edu/academics/colleges/CLAS/faculty-staff/policies/HandlingAcademicDishonesty/Pages/Definition-of-Academic-Dishonesty.aspx>.

This course assumes your knowledge of these policies and definitions. Failure to adhere to them can result in possible penalties ranging from lowering a grade on an assignment to dismissal from the University; so, be informed and be careful. If this is unclear to you, ask me.

The College of Liberal Arts and Sciences (CLAS) Ethics Bylaws allow the instructor to decide how to respond to an ethics violation, whether by lowering the assignment grade, lowering the course grade, and/or filing charges against the student with the Academic Ethics Committee.

### Tentative schedule

Topics	Monday	Wednesday	Quiz*
First order differential equations; separable equations; linear first order equations; modeling involving separable and first order equations	15-Jan no class	17-Jan Calc. rev.	
	22-Jan 1.1-1.3	24-Jan 1.4	1
	29-Jan 1.5	31-Jan 2.1	2
	5-Feb 2.3	7-Feb 2.4	3
Second (and higher) order ODE; explicit solutions for ODEs with constant coefficients; mechanical applications.	12-Feb Exam 1	14-Feb 5.1, 5.3	
	19-Feb 5.2	21-Feb 5.5	4
	26-Feb 5.4, 5.6	28-Feb 3.1, 3.2	5
Basics of matrix algebra. Solutions of algebraic linear systems. Vector spaces; linear independence of vectors; basis; eigenvectors and eigenvalues	5-Mar 3.3, 3.4	7-Mar 3.5, 3.6	6
	12-Mar Exam 2	14-Mar 4.1, 4.2	
	19-Mar no class	21-Mar no class	
	26-Mar 4.3, 4.4	28-Mar 4.5, 4.6	7
	2-Apr 4.7	4-Apr 6.1, 6.2	8
Systems of linear ODE with constant coefficients; eigenvector method of solution; applications	9-Apr 7.1	11-Apr 7.2	9
	16-Apr 7.3	18-Apr 7.4	10
Autonomous equations and systems; equilibrium solutions; stability; phase portrait; qualitative behavior of solutions near equilibrium	23-Apr Exam 3	25-Apr 2.2, 9.1	
	30-Apr 9.2	2-May 9.3	11

\* Wednesday, beginning of class

**Final Exam: TBA**

## Academic Policies

The following policies, procedures, and deadlines pertain to all students taking courses in the College of Liberal Arts and Sciences (CLAS). They are aligned with the Official University Academic Calendar found on the [Registrar's website](#).

### Schedule Verification

It is each student's responsibility to verify that their official registration and schedule of courses is correct in UCDAccess (not Canvas) before courses begin and by the university census date. Failure to verify schedule accuracy is not sufficient reason to justify post-census date adds. Access to a course through Canvas is not evidence of official enrollment.

### Email

Students must activate and regularly check their official CU Denver email account for university related messages. Note: Canvas is not the location to access your CU Denver email account. Log into <http://www.ucdenver.edu/email/Pages/login.aspx>

### Administrative Drops

Students may be administratively dropped if they do not meet the pre- and/or co-requisites for a course as detailed in the UCDAccess registration system. Students may also be administratively dropped from a course if the course syllabus articulates attendance expectations prior to census date and they do not meet those attendance expectations. Please note: this procedure does not apply to all courses and students should not rely upon it; if students plan to no longer complete a course, they are responsible to drop or withdraw from the course.

### Post-Census Date Adds and Late Withdrawals

Post-census date adds (i.e., adding a course after census date) require a written petition, verifiable documentation, and dean's approval via CLAS Advising. Late withdrawals (i.e., withdrawing from one or more full-semester courses after the withdrawal deadline but before the late withdrawal deadline) require a [Late Withdrawal Petition](#) submitted to CLAS Advising (NC 1030 – 303-315-7100). If petitioning to late-withdraw from individual courses, instructor signatures are required. If petitioning to late-withdraw from the entire semester, instructor signatures are not required. Contact CLAS Advising (NC 1030 – 303-315-7100) for more information on post-census date adds and late withdrawals.

### Co-Requisites and Drops/Withdrawals

Students dropping a course with co-requisite(s) before or by census date must drop the course and co-requisite(s). After census date, students withdrawing from a course with co-requisite(s) before or by the withdrawal deadline must withdraw from the course and co-requisite(s). After the withdrawal deadline, until the late withdrawal deadline, students may be able to withdraw from a course or co-requisite(s) based on instructor permission and approval of a [Late Withdrawal Petition](#).

### Waitlists

The Office of the Registrar notifies students via their CU Denver email account if they are added to a course from a waitlist. Students will have access to Canvas when they are on a waitlist, but this does not indicate that the student is officially enrolled or guaranteed a seat in the course. If a student is not enrolled in a course after waitlists are purged, instructor permission is required for the student to enroll in the course. The student must complete a [Late Add Form](#) and submit it to the Registrar's Office (SCB 5005) by census date in order to enroll in the course.

## Applicable Forms

### Schedule Adjustment Form

Submit to Registrar (SCB

5005)

Purpose:	Approval Signatures Required:	Dates:
Receive an academic overload	Student and CLAS Advising signatures	before Jan. 31 (5pm)
Receive a time conflict override	Student and instructor signatures	before Jan. 31 (5pm)
Designate a course pass/fail or no credit	Student signature	before Jan. 31 (5pm)
Withdraw from an intensive course before the withdrawal deadline	Student signature	Feb. 1 – April 1 (5pm)

### Late Add Form

Submit to Registrar (SCB

5005)

Purpose:	Approval Signatures Required:	Dates:
Add a course after the add deadline but before census date	Student and instructor signatures	Jan. 22 – Jan. 31 (5pm)

### Post-Census Date Add Petition information

Visit CLAS Advising (NC 1030) for more

Purpose:	Approval Required:	Dates:
Petition to add one or more full-semester courses after census date (verifiable documentation required)	Submitted petitions are reviewed by the CLAS Assistant Dean	after Jan. 31

### Late Withdrawal Petition 1030)

Submit to CLAS Advising (NC

Purpose:	Approval Signatures Required:	Dates:
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Petition to late-withdraw from a course after the withdrawal deadline but before the late withdrawal deadline Student and instructor signatures April 2 – May 2 (5pm)

Petition to late-withdraw from all courses in the semester after the withdrawal deadline but before the late withdrawal deadline Student signature April 2 – May 2 (5pm)

## Academic Calendar

<b>January 16</b>	<b>Beginning of Semester</b> – First day of classes.
<b>January 21 (11:59 pm)</b>	<b>Add Deadline</b> – Last day to add or waitlist a course using UCDAccess. After the add deadline but before census date, instructor permission on a <a href="#">Late Add Form</a> is required to add courses.
<b>January 22 (11:59 pm)</b>	<b>Drop Deadline</b> – Last day to drop a course without \$100 drop fee, including section changes (i.e., changing to a different section of the same course). Students may drop courses using UCDAccess. <b>No Adding of Courses is Permitted Today</b> <b>Waitlists Purged</b> – All waitlists are eliminated today. Students should check their schedule in UCDAccess to confirm the courses in which they are officially enrolled. Canvas does not reflect official enrollment.
<b>January 31 (5 pm)</b>	<b>Final Add Deadline (Instructor Permission Required)</b> Last day to add full-semester courses. To add a full-semester course between the first add deadline and census date, instructor permission on a <a href="#">Late Add Form</a> is required. Students may submit a completed <a href="#">Late Add Form</a> to the Registrar’s Office (SCB 5005). After census date, a written petition, verifiable documentation, and dean’s approval via CLAS Advising (NC 1030 – 303-315-7100) are required to add a full-semester course. If a student’s post-census date add petition is approved, the student will be charged the full tuition amount. College Opportunity Fund (COF) may not apply to courses added late, and these credits may not be deducted from students’ lifetime hours. <b>Final Drop Deadline</b> Last day to drop full-semester courses with a financial adjustment. Each course dropped, including section changes, between the first drop deadline and census date generates a \$100 drop fee. Students may drop courses in UCDAccess. After census date, withdrawal from courses appears on transcripts with a grade of “W,” and no financial adjustment is made. After census date but before the withdrawal deadline, students may withdraw from full-semester courses using UCDAccess (instructor permission is not required). <b>Graduation Application Deadline</b> Last day to apply for graduation. Undergraduates are expected to make an appointment to see their academic advisors before census date to apply for graduation. Graduate students must complete the Intent to Graduate and Candidate for Degree forms. <b>Pass/Fail, No Credit Deadline</b> – Last day to request No Credit or Pass/Fail grade for a course using a <a href="#">Schedule Adjustment Form</a> .
<b>March 19 – 25</b>	<b>Spring Break</b> – No classes. Campus open.
<b>April 1 (11:59 pm)</b>	<b>Withdrawal Deadline</b> After census date, students may withdraw from full-semester courses using UCDAccess (instructor permission is not required). To withdraw from an intensive course, students may use a <a href="#">Schedule Adjustment Form</a> . Withdrawal from courses appears on transcripts with a grade of “W” and no financial adjustment is made. After the withdrawal deadline but before the late withdrawal deadline, students may late-withdraw by submitting a <a href="#">Late Withdrawal Petition</a> to CLAS Advising (NC 1030 – 303-315-7100). Contact CLAS Advising (NC 1030 – 303-315-7100) for more information. After census date, students withdrawing from a course with co-requisite(s) before or by the withdrawal deadline must withdraw from the course and co-requisite(s). After the withdrawal deadline, until the late withdrawal deadline, students may be able to withdraw from a course or co-requisite(s) based on instructor permission and approval of a <a href="#">Late Withdrawal Petition</a> .
<b>May 2 (5 pm)</b>	<b>Late Withdrawal Deadline</b> Last day to petition to late-withdraw from one or more full-semester courses. Students may petition to late-withdraw by submitting a <a href="#">Late Withdrawal Petition</a> to CLAS Advising (NC 1030 – 303-315-7100). If petitioning to late-withdraw from individual courses, instructor signatures are required. If petitioning to late-withdraw from the entire semester, instructor signatures are not required. Contact CLAS Advising (NC 1030 – 303-315-7100) for more information. After the withdrawal deadline, until the late withdrawal deadline, students may be able to withdraw from a course with co-requisite(s) based on instructor permission and approval of a <a href="#">Late Withdrawal Petition</a> . After the late withdrawal deadline (or after grades are posted, whichever is sooner), only retroactive withdrawals are considered and verifiable documentation is required. Contact CLAS Advising (NC 1030 – 303-315-7100) for more information on retroactive withdrawals.
<b>May 7 – 12</b>	<b>Finals Week</b>
<b>May 12</b>	<b>End of Semester</b> <b>Commencement Ceremony</b>
<b>May 17</b>	<b>Final Grades Available</b> – Official grades available in UCDAccess and transcripts (tentative). Canvas does not display final grades.
<b>June 22</b>	<b>Degrees Posted</b> – Degrees posted for graduating students on transcripts.

