

## COURSE SYLLABUS

### MATH 264 Differential Equations

#### Course Duration

January 13 – May 1, 2025

#### Instructor

James Welker  
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#### Office Hours

Office hours are scheduled after class meetings or by appointment.  
Throughout the program, you can contact you instructor to discuss personal questions.

#### Course Materials

Dennis G. Zill and Warren S Wright, *Differential Equations with Boundary Value Problems*, 8<sup>th</sup> ed., Brooks/Cole, Belmont, CA, 2013. ISBN: 10-1-111-82706-0  
We will cover Chapters 1 to 4 almost in their entirety and parts of Chapters 7, and 8.

#### Course Description

The course can be broken out into several main units. Most topics are covered in the following chapters / subchapters of the textbook.

- Chapter 1: introduction to and classification of D.E., direction fields
- Chapter 2: first order D.E., method of integrating factor, separable equations, modelling with first order D.E., exact equations
- Chapter 3: second order linear D.E., homogeneous equations – the Wronskian, complex and repeated roots, nonhomogeneous D.E. with undetermined coefficients, variation of parameters, mechanical and electrical vibrations, forced vibrations
- Chapter 4: higher order linear D.E., general theory, homogeneous D.R. with constant coefficients, methods of undetermined coefficients and variation of parameters
- Chapter 5: spring-mass systems (free undamped motion), series circuit analogue (LRC-circuits)
- Chapter 7: Laplace transforms, definition of L.T., transforms and inverse transforms, transforms of derivatives, translation on the s-axis, derivatives of a transform
- Chapter 8: Systems of first order linear D.E., linear independence, eigenvectors and eigenvalues, basic theory of systems, homogeneous linear systems, distinct complex and repeated eigenvalues, nonhomogeneous linear systems, undetermined coefficients

#### Objectives

The subject of differential equations is foundational not only for mathematics, but also for applications to science and engineering. We will study various models for natural phenomena.

## Learning Outcomes

We will analyze in both a quantitative and a qualitative manner the solutions of the modeling equations, and interpret the results in the context of the model. Elementary linear algebra concepts will be introduced to elucidate the structure of the space of solutions to linear equations, and these concepts, along with matrix methods, will be applied to study systems of differential equations.

## Assignments

Homework will be assigned daily. It will cover problems taken from the sections covered during class. The problems are the minimum expected for you to succeed in the course; it is essential for you to do many problems to feel comfortable with the material. Many problems on quizzes and exams will reflect problems assigned in the daily homework, so although this is work that will not be directly graded, it will have a *significant impact* on your success in the course. *Reading* the assigned sections will be also generally be specified as part of the daily homework assignment.

## Grading

Students are expected to:

- Attend and actively participate in class
- Give presentations of selected problems in front of the auditorium
- Put some effort in doing homework from class to class
- Give support to each other and treat everybody with respect

## Grade Composition

There will be several components to your grade in this course. We will have three midterm exams and a cumulative final exam and approx. 8 quizzes. Additionally, we will have individual presentations on the smart board on specific DE problems. In class participation is an essential part of this course.

We will compute the grades out of 100 points (percent). You can earn points as follows:

- Quizzes (8)                      20 pts (weakest quiz will be eliminated)
- Midterm Exams (3)            60 pts (3x 20 points)
- Final exam                      20 pts

## Grading Scale

A	to students scoring between	100.00%	and	94.00 %
A-	to students scoring between	93.99	and	88.00 %
B+	to students scoring between	87.99	and	84.33 %
B	to students scoring between	84.32	and	80.67 %
B-	to students scoring between	80.66	and	77.00 %
C+	to students scoring between	76.99	and	73.33 %
C	to students scoring between	73.32	and	69.67 %
C-	to students scoring between	69.66	and	66.00 %
D+	to students scoring between	65.99	and	62.33 %
D	to students scoring between	62.32	and	58.67 %
D-	to students scoring between	58.66	and	55.00 %

An overall percentage of less than 55.00% means that you have failed this course.

### Attendance

Students are required to attend class. Any unexcused absence leads to point deduction. You will be asked to complete a substitute assignment for any missed class.

### Meeting Schedule

#### WEEKLY TIMEFRAME OF THIS COURSE - REFER TO AIB SCHEDULE

### Academic Integrity

Students at Lafayette and AiB are part of a broader academic community, with a shared set of values and assumptions, and united by the common goals of acquiring and advancing knowledge. Within that community are many smaller, specialized communities, each with its own specific conventions for working and communicating. In general, however, intellectual endeavor involves discussing the ideas that others have already expressed; striving to understand them more deeply; applying those ideas to new and far-reaching problems; and respectfully challenging those ideas and attempting to extend or even replace them in light of new discoveries.

We share the values of the academic community, which (among other things) require us to acknowledge the contributions that others have made and to continue to add to ongoing intellectual conversations. Failure to uphold this value, either intentionally or inadvertently, is a violation of the community's standards. Moreover, certain violations of the community's standards clearly rise to the level of academic dishonesty and can have serious consequences.

### Diversity, Equity, Inclusion, Respect

Every member of the AiB community has the right to expect respect in the exchange of ideas and perspectives.

In the spirit of shared humanity and concern for our community and the world, we recognize that our learning activities and design solutions can either support, or be biased against, groups of people and individuals. Thus, our international seminar is dedicated to cultivating and maintaining an equitable and culturally inclusive and welcoming environment where difference is valued, respected and celebrated. In this class we will be committed to and accountable for advancing human diversity, equity, inclusion, and respect. This applies to:

- i) our class interactions (each of your voices is vital and legitimate!)
- ii) our engagement and collaborations with Triboro partners and all of its residents (their voices are vital and legitimate!)
- iii) the ideas that are reflected in our work—acknowledging that landscapes and places also play a vital role in inclusion, equity, diversity and civil discourse.

We disavow systemic patterns of prejudice, including speech or actions that attempt to silence, threaten, disadvantage, belittle, or displace groups and individuals. We advocate for social and environmental justice and inclusive communities and places as we work toward an equitable, democratic, and sustainable society. As future landscape architects, you have the opportunity and responsibility to craft civic spaces and landscapes that are welcoming to all persons.

### The Student Code of Conduct

The Student Code of Conduct will be followed. It is important, but since it's quite lengthy, see: <https://conduct.lafayette.edu/student-handbook/student-code-of-conduct/>. Seriously inappropriate behavior may result in being referred to the Office of Student Conduct, with possible sanctions including removal from the program.

### **Disability Accommodation**

We will abide by Lafayette College policy on disability accommodation. We welcome students with disabilities into our educational programs. The Lafayette College Campus has an office for students with disabilities. Accessibility Services website provides contact information here: <https://hub.lafayette.edu/disability-services/> . In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office. If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with AiB and your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.”

### **COVID 19 Policies and Accommodations**

Lafayette Engineering students must adhere to safety guidelines because, as members of the AiB community, you share a collective responsibility to engage in simple-to-follow practices that protect the safety and health of everyone. Failure to adhere to these guidelines will disrupt the learning experiences.

If you have potential COVID-19 symptoms or have been in contact with someone who has symptoms or tests positive, you should not come to class. Call your Program Director or the AiB Emergency Number and ask for next steps. You must wear a mask appropriately (i.e., covering both your mouth and nose) in the AiB building, and maintain social distancing of at least six feet of space between individuals when possible. Anyone attending class in person without a mask will be asked to put one on or leave. Refusal to comply with AiB policies is a violation of the Student Code of Conduct. Students who refuse to wear masks appropriately may face disciplinary action for Code of Conduct violations. AiB faculty may end class if a student refuses to wear a mask appropriately.

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