

# MA 30300: Differential Equations and Partial Differential Equations for Engineering and the Sciences

## Section 415&416 — Spring 2024

### Instructor Information

*Name:* Dr. Chen Liu

*Office:* MATH 405

*Email:* liu3373@purdue.edu

*Office Hours:* 14:00–17:00 on Wednesday or by appointment.

### Class Information

*CRN:* Section 415: 20799; Section 416: 20813

*Time:* Section 415: TR 10:30 – 11:45

Section 416: TR 12:00 – 13:15

*Classroom:* WALC 3127 (Sec. 415), WALC 3127 (Sec. 416)

### Course Description

Credit Hours: 3.00. This is a methods course for juniors in any branch of engineering and science, designed to follow MA 26200 or MA 26600. Materials to be covered are: linear systems of ordinary differential equations, nonlinear systems, Fourier series, separation of variables for partial differential equations, and Sturm-Liouville theory.

### Learning Resources

[MyLab with Pearson eText](#) Differential Equations and Boundary Value Problems, 6th edition, by Edwards, Penney, and Calvis.

[Brightspace](#) The Brightspace course page will be a source of communication to you aside from class. There, you will find notes, supplemental studying material, and some important announcements.

[Department Course Webpage](#)

### Homework

Details and due dates of homework can be found on the schedule table (Calendar) in Brightspace.

Online homework: There are online homework assignments from **MyLab Math** that are accessed through [Brightspace](#). It's possible that at the end of the semester three lowest online homework scores will be dropped.

Handwritten homework: There are also some handwritten problems will be collected electronically through [Gradescope](#). No handwritten homework scores will be dropped.

### Midterms

There are two midterm in-person evening exams. Two classes will be cancelled as per university policy to compensate for the two evening exams. The time and location of the two Midterms are:

	Date	Time	Location
Midterm 1	Mon 02/26, 2024	8:00p - 9:00p	PHYS 112
Midterm 2	Wed 04/03, 2024	6:30p - 7:30p	LILY 1105

## Grades

Online Homework	22%
Written Homework	6%
Midterm 1 (evening exam)	18%
Midterm 2 (evening exam)	18%
Final Exam	36%
TOTAL	100%

## Grading Scale

Students who get at least 97% of the total points in this course are guaranteed an A+, 93% guarantees an A, 90% an A-, 87% a B+, 83% a B, 80% a B-, 77% a C+, 73% a C, 70% a C-, 67% a D+, 63% a D, and 60% a D-; for each of these grades, it's possible that at the end of the semester a somewhat lower percentage will be enough to get that grade.

## Learning outcomes

Upon successful completion of this course, students will be able to:

- Classify homogeneous first order linear systems of differential equations by their phase portraits and solve them by using the eigenvalue method.
- Analyze the behavior of nonlinear systems near critical points by their stability and type and apply this knowledge to study some ecological models and mechanical systems.
- Use the method of Laplace transform to solve linear differential equations.
- Use the Fourier series and the method of separation of variables to solve partial differential equations.
- Use the eigenfunction expansion method to solve Sturm-Liouville problems.

## Quiet Period

Per university regulations, the week preceding the final exams week is designated as the "Quiet Period." During this time, no assignments (including homework) can be assigned or collected, unless your course has no exams scheduled for the final exam week. Further details regarding this policy can be found [here](#).

## Updated Drop/Add calendars

In accordance with the University Senate's adoption of Document 22-23, the course drop deadlines have been extended from the end of week 9 to the end of week 13 (April 24 for Spring 2024). You can access the updated Drop/Add calendars by visiting:

<https://purdue.edu/registrar/calendars>

Scroll down to locate the Drop/Add Refund & Deadline Calendars, or simply follow this [direct link](#). Please be aware that certain 2023-24 calendars, created prior to this update, display incorrect deadlines. These outdated calendars might still be accessible on certain Purdue websites.

## Attendance Policy

This course follows Purdue's academic regulations regarding attendance, which states that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by email or phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases falling under excused absence regulations, the student or the student's representative should contact or go to the [Office of the Dean of Students \(ODOS\) website](#) to complete appropriate forms for instructor notification. Under academic regulations, excused absences may be granted **by ODOS** for cases of grief/bereavement, military service, jury duty, parenting leave, or emergent or urgent care medical care.

## Academic Guidance in the Event a Student is Quarantined/Isolated

If you must miss class at any point in time during the semester, please reach out to me via Purdue email so that we can communicate about how you can maintain your academic progress. For COVID-19 concerns, please see the [Fall 2023: What you need to know guidance published July 27](#). If you find yourself too sick to progress in the course, notify your adviser and notify me via email or Brightspace. We will make arrangements based on your particular situation.

## Classroom Guidance Regarding Protect Purdue

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the [Office of the Student Rights and Responsibilities](#). See also [Purdue University Bill of Student Rights](#) and the Violent Behavior Policy under University Resources in Brightspace.

## Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing in-

tegrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information is submitted the greater the opportunity for the university to investigate the concern. More details are available on our course Brightspace under University Policies.

### **Nondiscrimination Statement**

Purdue University is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. A hyperlink to Purdue's full Nondiscrimination Policy Statement is included in our course Brightspace under University Policies.

### **Accessibility and Accommodations**

Purdue University strives to make learning experiences accessible to all participants. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: [drc@purdue.edu](mailto:drc@purdue.edu) or by phone: 765-494-1247.

If you have been certified by the Disability Resource Center (DRC) as eligible for accommodations, you should contact your instructor to discuss your accommodations as soon as possible. Here are instructions for sending your Course Accessibility Letter to your instructor:

<https://www.purdue.edu/drc/students/course-accessibility-letter.php>

### **Mental Health/Wellness Statement**

**If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack.** Sign in and find information and tools at your fingertips, available to you at any time.

**If you need support and information about options and resources,** please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

**If you find yourself struggling to find a healthy balance between academics, social life, stress, etc.,** sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is free and can be done on BoilerConnect.

**If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students.** If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours. The [CAPS website](#) also offers resources specific to situations such as COVID-19.

### **Missed or Late Work**

Late work (for which you do not have a University approved excused absence) will NOT be accepted.

### **Basic Needs Security**

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it relates to COVID-19, students may submit requests for emergency assistance from the [Critical Need Fund](#).

### **Emergency Preparation**

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

### **Disclaimer**

This syllabus is subject to change. Please check the [Brightspace](#) page for the most recent version.