MA 30300: Differential Equations and Partial Differential Equations

for Engineering and the Sciences
Section 759&760 — Fall 2023

Instructor Information

- **Name:** Ying Liang
- **Office:** MATH 403 (Office Hours: Wed 1:00 pm - 2:30 pm, 3:30 pm - 5:00 pm)
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Course Information

- **Time and classroom:** Section 760: MWF 9:30 am - 10:20 am, UNIV117
  Section 759: MWF 2:30 pm - 3:20 pm, UNIV119

- Class Webpage

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

Textbook: 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.

Exams

All examinations are close book and note.
Two Midterm Exams
More information will be announced closer to each exam, including the location.
Final Exam
There will be a two-hour comprehensive common final exam given during final exam week.

Homework

Online homework: There are online homework assignments from MyLab Math that are accessed through Brightspace.   Quick Student Guide to MyLabMath

Handwritten homework: There are also some handwritten problems will be

collected electronically through Gradescope.

 Submit PDF homework in Gradescope Details of homework can be found on the

schedule table.

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.

Grades

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

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.

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.

Academic Integrity

Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III- -B- -2- -a, Student Regulations] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72- -18, December 15, 1972] Please refer to Purdue's student guide for academic integrity (https://www.purdue.edu/odos/osrr/academic-integrity/index.html).

Students with disabilities

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 or by phone at 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

Missed or Late Work

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

Nondiscrimination Statement

Purdue University is committed to maintaining a community which 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.

Drop/add calendar

 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 (November 27 for Fall 2023). 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:
https://catalog.purdue.edu/preview_program.php?catoid=16&poid=27595

Use of Copyrighted Materials

Students are expected, within the context of the Regulations Governing Student Conduct and other applicable University policies, to act responsibly and ethically by applying the appropriate exception under the Copyright Act to the use of copyrighted works in their activities and studies. The University does not assume legal responsibility for violations of copyright law by students who are not employees of the University.

A Copyrightable Work created by any person subject to this policy primarily to express and preserve scholarship as evidence of academic advancement or academic accomplishment. Such works may include, but are not limited to, scholarly publications, journal articles, research bulletins, monographs, books, plays, poems, musical compositions and other works of artistic imagination, and works of students created in the course of their education, such as exams, projects, theses or dissertations, papers and articles. Please refer to the University Regulations on policies (https://catalog.purdue.edu/content.php?catoid=13&navoid=16335).