

## Math 6307 Syllabus

Ordinary Differential Equations I, Math 6307, Section A, 3 Credits

Fall 2026

### Instructor Information

---

**Instructor: Chongchun Zeng**

**Email: zengch@math.gatech.edu**

### General Course Information

---

#### Description

This sequence develops the qualitative theory for systems of ordinary differential equations. Topics include stability, Lyapunov functions, Floquet theory, attractors, invariant manifolds, bifurcation theory, normal forms. First of two courses.

#### Course Learning Outcomes

In this semester, we will develop the qualitative theory for systems of ordinary differential equations. Subjects are rough limit sets, stability, Lyapunov functions, linear systems, Floquet theory, attractors, invariant manifolds, bifurcation theory, normal forms, periodic orbits. The topics are among the following.

- General properties: existence, uniqueness, continuous dependence, stability, Lyapunov functions, limit sets, Poincare-Bendixson theorem
- Linear Systems: constant coefficient systems, periodic systems, nonhomogeneous systems, Fredholm alternative, Hamiltonian systems, mappings
- Local theory near equilibria: Hartman-Grobman theorem, stable and unstable manifolds, foliations, center manifolds, elementary bifurcations and the Hopf bifurcation
- Periodic orbits: Poincare map, persistence, Hamiltonian systems.

#### Required Course Materials

Ordinary differential equations with applications, Carmen Chicone, 3rd edition, Springer. (Available online through GT library.)

**Grading Policy:**

Final exam 55%; Homework 15%, 15%, 15%.

A $\geq$ 90; B $\geq$ 80; C $\geq$ 70; D $\geq$ 60.

**Assignments**

- Homework 1, 15%
- Homework 2, 15%
- Homework 3, 15%
- Final exam, 55%

**Description of Graded Components**

Homework can be discussed, but must be written down independently (no human or AI help).

The final exam is `open-textbook' and `open-notes' and must be done entirely independently (no human or AI help).

**Course Policies**

---

**Attendance and/or Participation**

This will be an active classroom, where you will be expected to participate.

**Academic Integrity**

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review [Georgia Tech's Honor Code](#) and the student [Code of Conduct](#).

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

**Core IMPACTS**

[Core IMPACTS](#) is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated [career competencies](#). [This resource](#) developed by the Center for Excellence in Teaching and Learning and Online Education at

Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

### **Accommodations for Students with Disabilities**

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

### **Student-Faculty Expectations Agreement**

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

### **Pre- &/or Co-Requisites**

Math 2552 and Math4542 or permission of the instructor

### **Collaboration, Group Work, and Use of Generative AI**

You are allowed to work in groups on all homework and out-of-class assignments (and you may use my solutions), but any work you turn in must be written in your own hand without AI help.

The final exam must be done entirely independently (no human or AI help).

### **Extensions, Late Assignments, & Re-Scheduled/Missed Exams**

Late homework will be penalized accordingly or rejected.

Make-up exams are given only for illness, approved Institute activities, or religious observances.