

# MATH/CMPSC 456 Syllabus

Instructor: **Xiantao Li**, Professor of Mathematics

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**Course Content and objectives:** Nonlinear system of equations; Least squares problems and orthogonal polynomials; Eigenvalue Problems; Singular value decomposition; Approximation of Ordinary Differential Equations; Approximate solutions of Partial Differential Equations.

**Textbook:** *Numerical Analysis (10nd Edition)*, Burden and Faires.

**Topics:** Nonlinear equations (10.1-10.4). Least square and orthogonal polynomials (8.1-8.5); Eigenvalue problems (9.1-9.6); Solutions of ODEs (5.1-5.11); Solutions of PDEs (12.1-12.3).

**Prerequisites:** Single variable calculus; matrix algebra; some knowledge of computer programming: Matlab, C, Fortran, or any other computer language.

**Homework:** homework sets will be assigned, via canvas (**File** folder), and is due every week on **Wednesdays**. They should be submitted to canvas as a **PDF** file. Some homework will include computer projects. Homework and computer projects should be finished with individual effort, and the assigned problems/projects are not allowed to be shared with third parties. The project report should contain relevant data and clear display of solutions. Use tables and graphs if necessary. Include the source code with the report if a computer project is assigned. Late homework submissions will not be accepted unless extenuating circumstances arise. In these cases, you must discuss the situation as soon as possible with Prof. Li. Foreseeable conflicts with due dates must be presented to Prof. Li before the due date. Any late homework submission without consulting with Prof. Li will receive zero credit.

**Exams:** one midterm, and one final exam.

**Final grade:** Midterm 30%; Final 40%; Homework 30%. The homework with the lowest grade will be dropped. General grading guideline: 92% guarantees an A, 85% guarantees a B, 75% guarantees a C, and 60% is passing (i.e. a D).

**The drop/add deadlines.** Regular Drop: January 15 at 11:59 p.m., 2022; Regular Add: January 16 at 11:59 p.m., 2022; Late drop: April 8 at 11:59 p.m., 2022.

**Academic Integrity Policies.** All [Penn State Policies](#) regarding ethics and honorable behavior apply to this course. Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. All University policies regarding academic integrity apply to this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. For any material or ideas obtained from other sources, such as the text or things you see on the web, in the library, etc., a source reference must be given. Direct quotes from any source must be identified as such. All exam answers

must be your own, and you must not provide any assistance to other students during exams.

**Policies for students with disabilities** Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Office for Disability Services (ODS) Web site provides contact information for every Penn State campus: <http://equity.psu.edu/ods/dcl>. For further information, please visit the Office for Disability Services Web site: <http://equity.psu.edu/ods>.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <http://equity.psu.edu/ods/doc-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. You must follow this process for every semester that you request accommodations.

**Counseling and psychological services.** The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation. Counseling and Psychological Services at University Park (CAPS): 814-863-0395.

**Educational equity/Report Bias.** Consistent with University Policy AD29, students who believe they have experienced or observed a hate crime, an act of intolerance, discrimination, or harassment that occurs at Penn State are urged to report these incidents as outlined on the University's Report Bias webpage.