

**Tandon School of Engineering, New York University**  
Department of Electrical and Computer Engineering

---

**ECE-GY 5253: *Applied Matrix Theory***

Instructor:	Prof. Z. P. Jiang	Contact hours:	before/after class
	Phone: (646) 997-3646		or, by appointment
	<a href="mailto:zjiang@nyu.edu">zjiang@nyu.edu</a>		Room 1001, Jay 370

**Course Outline**

<u>Week</u>	<u>Subject</u>
I	Elementary facts about matrices and determinants
II	Theory of linear equations
III	Eigenvalues and eigenvectors
IV-VI	Canonical forms and transformations
VII	The Jordan canonical form
VIII	<b>Midterm</b>
IX-X	Norms, location of eigenvalues, and singular value decomposition
XI	Matrix analysis of differential and difference equations
XII	Application to stability analysis of linear systems
XIII	Computational Issues and Applications in Machine Learning
XIV	Nonnegative matrices
XV	<b>Final (12/19/2022)</b>

**References:**

- (Recommended Text) R.A. Horn and C.R. Johnson, *Matrix Analysis*. 2nd edition. Cambridge Univ. Press, 2013. ISBN: 978-0-521-54823-6
- A. J. Laub, *Matrix Analysis for Scientists and Engineers*. SIAM, 2005.
- (Math.-oriented) F. R. Gantmacher, *The Theory of Matrices*. Vol. I & Vol. II, 1953.
- Class notes.

**Grading Policy:** Midterm: 35% ,      Final: 45%,      Homework: 20%

**TAs:** Tong Liu, Jiho Park

*Note:* All lecture notes and weekly homework/ HW solutions will be posted at the course site in the NYU LMS.