MAT 2105: Linear Algebra I
Recitation

Stern College for Women
Yeshiva University
Spring 2024

Instructor: Dr. Marian Gidea (marian.gidea@yu.edu)
Student Assistant: Dachao Sun (dsun1@mail.yu.edu)

Location: Beren | 719
Time: Tue. 4:30-5:20pm

Octave-Online.net
Installing Jupyter
online-python.com
Source Code Beautifier
Jupyter Guide to Linear Algebra
Python Numerical Methods
Dobrushkin, Linear Algebra with Python
Hicks, Linear Algebra and Python Basics
CS 51P: Intro to Computer Science, Pomona
House, Chapter 1: Vectors
House, Chapter 2: Simple Image File Formats
Math 22: Linear Algebra, Dartmouth College

Schedule:

Week 1	Recitations each week are mainly for discussing homework assignments and course material; in addition, there are *supplemental* programming labs/activities (roughly biweekly), in which we explore basic linear algebra operations in Python as well as implementing from scratch some of the algorithms. *(no recitation this week)*
Week 2 (Jan. 23) slides	Optional Reading: Tucker, A. (1993) "Introductory Example" at beginning of Lay's ch.1 The History of Linear Algebra (video, 16:40) **Lab 1: Programming Environment, Python Basics** §1.1: 11, 13, 15, 17, 19, 27, 28 §1.2: 7, 9, 11, 13, 15, 17, 19, 20 & 33
Week 3 (Jan. 30)	Optional Reading: Vectors (video, 9:51) §1.3: 3, 5, 7, 9, 11, 13, 17, 25 (about span) slides/on board, recording (no sound) Note: Sorry recording was incomplete, and we only talked over a few selected problems (upon asked); next time may plan to go more "sequentially" as planned.
Week 4 (Feb. 6)	Optional Reading: Sample matrix class test_matrix.cxx snippet "Independence, Basis, and Dimension" by MIT OpenCourseWare (or Strang's full lecture starting 4'33") §1.4 (Matrix Eq. $A\mathbf{x} = \mathbf{b}$): 7, 9, 11, 13, 15, 21 §1.5 (Sol. Sets): 1, 3, 5, 7, 9, 11, 19, 21 slides/on board, pre-recorded-§1.4, recording-both §1.4-1.5 *If you have time, please go through 'Lab 1' (or other resources) and have Python installed/set up, because next week we'll talk about/do Lab 2 (thanks~).*
Week 5 (Feb. 13)	Optional Reading: Skim through this tutorial §1.7 (Linear Indep.): 1, 9, 11, 15, 17, 21, 31, 33 §1.8 (Lin. Transf.): 1, 3, 5, 13, 15, 17, 24, 31 **Lab 2: Preparing a Matrix Class** slides/on board, recording
Week 6 (Feb. 20)	Optional Reading: Brief summary "Basic Proof Techniques" §1.9 (Matrix of Lin. Transf.): 1, 3, 5, 7, 9, 15, 17, 19, 37, 39 **Lab 3: Preparing a Vector Class** slides/on board, recording (my notes for §1.7 Lin. Indep.)
Week 7 (Feb. 27)	§2.1 (Mat. Operations): 1, 3, 5, 7, 9, 11 §2.2 (Inverse): 1, 3, 5, 7, 13, 19, 31, 33 §2.3 (Char. Invertible Mat.): 1, 3, 5, 7, 9, 33 Practice Material for Midterm | slides/on board, recording
Week 8 (March 5)	§2.4 (Partitioned): 1, 3, 5, 7, 9, 16, 21 Ref: Manga Guide to Linear Algebra (Takahashi et al., 2012) Ref: Linear Algebra: A Pure Mathematical Approach (Rose, 2002) slides/on board: Part A, Part B, Part C recording
Week 9 (March 12)	Optional Reading: "Boolean Matrices," (Gersting, J. L., 2003, pp.327) and *Schaum's Outline* of Intermediate Algebra (Steege & Bailey, 1997) also check out this Octave manual on matrix manipulation slides recording two example data (matrices) for this computer problem: a 20-by-30 matrix, and a 5-by-10 matrix
Week 10 (March 19)	Optional Reading: Basis of a Vector Space and Two Additional Vector Spaces by Kevin Cheung of Carleton University (Canada) Today was about a remark on LU-factorization, plus going over Quiz 5 again: slides and recording scratchwork 2-(ii)
Week 11 (March 26)	Optional Reading: "Not So Vicious Cycles. Cycles in Permutations" (Bóna, M., 2006, Ch. 6, pp. 109) Section 3.1 of Bóna's book, Permutations and regarding Permutation as Bijection For exercises #15 & #17 of §3.1 - Determinants of Matrices by Richard Wright of Andrews Academy Section 5.2 "Permutations and Cofactors" of Strang (2009) §2.8 (Subspaces of $\mathbb{R}^n$): 1, 3, 9, 12, 14, 23, 25 §3.1 (Determinants): 3, 5, 7, 9, 11, 15, 17, 19, 20, 22, 38, 41 slides (revised), recording