Syllabus with Schedule

Spring 2016   Math 1180

Where: 627 Thackeray Hall   When: M, W, F 11:00-11:50 am

Instructor: ShiTing Bao (Ellen)

Office: 608 Thackeray Hall   Email: ellenbao@pitt.edu

Office Hour: M, W, F 10:00-10:50 am

About the course
This is a core undergraduate course in linear algebra and matrix analysis for mathematics majors. The emphasis will be placed on the understanding of concepts and their application in further development of the theory. Specifically, the course covers topics such as solutions of linear equations, matrix algebra, linear transformations, orthogonality, general linear vector spaces, basis, dimension, and eigenvalues/eigenvectors. The grade will be based on evaluation of both problem solving and theorem proving skills.

Prerequisite
Multi-variable Calculus (Math 0240 or equivalent). Introduction to Theoretical Mathematics (Math 0413 or equivalent).

Text
The text for this course is David Poole, *Linear Algebra: A Modern Introduction, 4th Edition*.

Homework
Each week, you will be assigned problems to write up and hand in. These assignments will be graded and returned. Homework is usually due on every Monday.

Exams
The dates and locations of the midterm and final exam will be announced in class. You MUST attend the exams.

Grades
Your course grade will be determined as follows:
   * Midterm exam 30%
   * Final exam 40%
   * Written assignments 30%

Getting Help
Tutoring
Walk in tutoring is available in the Calculus/Engineering Lab and in the Math Assistance Center (MAC) in Room 215 of the O'Hara Student Center. Tutoring hours will be posted outside the lab and the MAC.
You should go the Calculus/Engineering Lab for help with computer work, and to the MAC for assistance with pencil and paper work.

Disability Resource Services
If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services as early as possible in the term.

Academic Integrity
Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity will incur a minimum sanction of a zero score for the quiz, exam or paper in question. Additional sanctions may be imposed, depending on the severity of the infraction.

On homework, you may work with other students or use library resources, but each student must write up his or her solutions independently. Copying solutions from other students will be considered cheating, and handled accordingly.

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Schedule

Week 1. (1/6-8)
  1.1 Geometry and algebra of vectors
  1.2 Length and angle: the dot product

Week 2. (1/11-15)
  1.3 Lines and planes
  2.1 Introduction to systems of linear equations

Week 3. (1/20-22)
  2.2 Direct methods for solving linear systems
  2.3 Spanning sets and linear independence

Week 4. (1/25-29)
  2.3 Spanning sets and linear independence
  3.1 Matrix operations
  3.2 Matrix algebra

Week 5. (2/1-5)
  3.3 The inverse of a matrix
  3.5 Subspaces, basis, dimension, and rank
  3.6 Introduction to linear transformations

Week 6. (2/8-12)
  3.6 Introduction to linear transformations
  4.1 Introduction to eigenvalues and eigenvectors

Week 7. (2/15-19) 4.2 Determinants

Week 8. (2/22-26)
  4.3 Eigenvalues and eigenvectors of nxn matrices

Week 9. (2/29-3/4) Review and Midterm

Week 10. (3/14-3/18)
  4.4 Similarity and diagonalization
  5.1 Orthogonality in R^n

Week 11. (3/21-3/25)
  5.2 Orthogonal complements and orthogonal projections
  5.3 The Gramm-Schmidt process and the QR factorization

Week 12. (3/28-4/1)
  5.4 Orthogonal diagonalization of symmetric matrices
  6.1 Vector spaces and subspaces

Week 13. (4/4-3/8)
  6.2 Linear independence, basis, and dimension
  6.3 Change of basis

Week 14. (4/11-4/15)
  6.4 Linear transformations
  6.5 The kernel and range of a linear transformation.

Week 15. (4/18-4/22) Review

Final Exam TBA