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Nanchang University
MATH23: Linear Algebra
(Last Updated in Jan. 2023)

Credit: 4

Contact Hours

This course is composed of 24 lecture sessions, 3 tutorial sessions and 9 office contact hours. Each lecture session takes 2 contact hours in length; each tutorial session takes 3 contact hours in length; There will be a Q-A review session (3 contact hours) and Final Exam (3 contact hours) at the end of this term. This course has 72 contact hours in total.

Course Description

Students who complete Math 23 are expected to have mastered the fundamental ideas of linear algebra and to be able to apply these ideas to a variety of practical problems.
More specifically, in Math 23 you will be expected to:
1. Explore and learn the core concepts, which include systems of linear equations,matrices, vectors, determinants, linear transformations, orthogonality, and eigenvalues;
2. Begin to think abstractly about certain of these topics;
3. Understand how these ideas can be used to solve problems and compute things.

Note: This Syllabus is subject to change based on the needs of the class.

Required Textbook

Textbook: *Linear Algebra*, *a Modern Introduction*, Third Edition by David Pole.

Grading

•Participation	10%
•Homework / Quizzes	10%
•Midterm 1	25%
•Midterm 2	25%
•Final Exam	30%

A+ 96-100	A 90-95	A- 85-89
B+ 82-84	B 78-81	B- 75-77
C+ 71-74	C 66-70	C- 62-65
D 60-61	F < 60	

Course Schedule

The course has 24 class sessions in total. All sessions are 2 contact hours in length. At the end of this term, there will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours).
Note: the course outline and required readings are subject to change.

Class 1:
Introduction to the course
Section 1. The Geometry and Algebra of Vectors

Class 2:
Review of homework assignments
Section 1.2 Length and Angle. The Dot Product

Class 3:
Review of homework assignments
Section 1.3 Lines and Planes

Class 4:
Review of homework assignments
Section 2.1 Introduction to Systems of Linear Equations

Class 5:
Review of homework assignments
Section 2. Direct Methods for Solving Linear Equations

Class 6:
Review of homework assignments
Section 2.3 Spanning Set and Linear Independence

Class 7:
Review of homework assignments
Review for the Midterm 1

Class 8:
Midterm No. 1
Class 9:
Section 3.1 Matrix Operations

Class 10:
Review on homework assignments
Section 3.2 Matrix Algebra

Class 11:
Review on homework assignments
Section 3. The Inverse of a Matrix

Class 12:
Review of homework assignments
Section 3.5 Subspaces, Basis, Dimension and Rank

Class 13:
Review of homework assignments
Section 3.6 Introduction to linear transformations

Class 14:
Review of homework assignments
Section 4.1 Introduction to Eigenvalues and Eigenvectors

Class 15:
Section 4.2 Determinants
Review for Midterm 2
Midterm No. 2

Class 16:
Section 4.3 Eigenvalues and Eigenvectors of n x n Matrices

Class 17:
Section 4.3 Eigenvalues and Eigenvectors of n x n matrices (Cont.)

Class 18:
Review of homework assignments
Section 4. Similarity and Diagonalization

Class 19:
Section 4. Similarity and Diagonalization (Cont.)

Class 20:
Review of homework assignments
Section 5.1 Orthogonality

Class 21:
Review of homework assignments
Section 5.2 Orthogonal Complements and Orthogonal Projections
Section 5.3 The Gram-Schmidt Process

Class 22:
Section 5.4 Orthogonal Diagonalization of Symmetric Matrices
6.1Vector Spaces and Subspaces
6.2 Linear Independence, Basis, and Dimension

Class 23:
6.3 Change of Basis
6.4 Linear Transformations
6.5 The Kernel and Range of a Linear Transformation

Class 24:
6.6 The Matrix of a Linear Transformation
7.1 Inner Product Spaces
7.2 Norms and Distance Functions
7.3 Least Squares Approximation

Attending Policy

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

Policy on "Late Withdrawals"

In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

Academic Honesty

Nanchang University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

General Expectations:

Students are expected to:
— Attend all classes and be responsible for all materials covered in class and otherwise assigned;
— Complete the day's required reading and assignments before class;
— Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;
— Participate in class discussions and complete required written work on time;

— Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;

— While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

Special Needs or Assistance

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.