



Philadelphia University
Faculty of Science
Department of Basic Sciences and Mathematics
First Semester, 2014/2015

Course Syllabus

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| Course Title: Linear Algebra 2 | Course code: 250341 |
| Course Level: 2 | Course prerequisite (s) and/or corequisite (s): Linear Algebra 1 |
| Lecture Time: Sun .,Tues., and Thursday 09:10 - 10:00 | Credit hours:3 credit hours |

Academic Staff

Specifics

| Name | Rank | Office Number and Location | Office Hours | E-mail Address |
|------------------------|---------------------|-----------------------------------|--|------------------------------------|
| Dr.Rahma aldaqa | Assist.Prof. | 818 | Sun 10:00-11:00 Mon 09:30-10:30 Tue 10:00-11:00 Wed 09:30-10:30 Thu 10:00-11:00 | Raldaqa@philadelphia.edu.jo |

Course module description:

It includes the study of linear equations, matrix operations, vector space and subspace, eigenvalues and eigenvectors, rotation of coordinate axes-, diagonalization, general linear transformations, and inverse transformations.

Course module objectives:

- To enable the students to carry on matrix operations.
- To enable students to solve linear equations using matrices.
- To understand the concepts of vector spaces.
- To understand eigenvectors and eigenvalues and systems of linear equations.
- To carry on transformations and inverse transformations.

Course/ module components**Text Book****Title: Elementary Linear Algebra 9th Edition.****Author Howard Anton****Publisher: Wiley 2003**

- **Support material (s) (vcs, acs, etc) .**
- **Study guide (s) (if applicable)**
- **Homework and laboratory guide (s) if (applicable) .**

Teaching methods:

Lectures, discussion groups, tutorials, problem solving, debates, etc.

Learning outcomes:

- Knowledge and understanding
Understanding of the concepts of vectors and linear algebra .
- Cognitive skills (thinking and analysis).
Applying the principles of systems of linear equations and matrices in some real world problems
- Communication skills (personal and academic).
Scientific thinking and applications develops communication skills
- Practical and subject specific skills (Transferable Skills).
Applying the concepts of linear algebra in simple experiments

Assessment instruments

- Short reports and/ or presentations, and/ or Short research projects.
- Quizzes.
- Home works.
- Final examination: 40 marks

| <u>Allocation of Marks</u> | |
|---|-------------|
| Assessment Instruments | Mark |
| First examination | 20% |
| Second examination | 20% |
| Final examination: 50 marks | 40% |
| Reports, research projects, Quizzes, Home works, Projects | 20% |
| Total | 100 |

Documentation and academic honesty

- Documentation style (with illustrative examples)
- Protection by copyright
- Avoiding plagiarism.

Course/module academic calendar

| Week | Basic and support material to be covered | Homework/reports and Their due dates |
|--------------------------------------|---|---|
| (1) | <u>CH01: System Of Linear Equations And Matrices</u> <ul style="list-style-type: none"> • Introduction to systems of linear equations • Gaussian elimination • Matrices and matrix operations • Inverses ,Rules of matrix arithmetic | Homework Ex 1.1,1.2,1.3,1.4 |
| (2) | <ul style="list-style-type: none"> • Elementary matrices and a mehod for finding A^{-1} • Further results on systems of equations and invertibility • Diagonal, Triangular, and Symmetric Matrices | Homework Ex 1.5,1.6,1.7 |
| (3) | <u>Ch02: Determinants</u> <ul style="list-style-type: none"> • Determinants by Cofactor Expansion • Evaluating Determinants by Row Reduction | Homework Ex 2.1,2.2 |
| (4) | <ul style="list-style-type: none"> • Properties of the Determinant Function • A combinatorial Approach to Determinants | Homework Ex 2.3,2.4 |
| (5) | <u>CH05: General Vector Spaces</u> <ul style="list-style-type: none"> • Real vector spaces • Subspaces | Homework Ex 5.1,5.2, reports |
| (6) First examination | <ul style="list-style-type: none"> • Linear independence • Basis and dimension | Homework Ex 5.3,5.4 |
| (7) | <ul style="list-style-type: none"> • Row Space, Column Space, and Null Space • Rank and Nullity | Homework Ex 5.5,5.6 |
| (8) | <u>Ch06: Inner Product Space</u> <ul style="list-style-type: none"> • Inner Products • Angle and Orthogonality in Inner Product Spaces | Homework Ex 6.1,6.2 |
| (9) | <ul style="list-style-type: none"> • Orthonormal Bases; Gram Schmidt process | Homework Ex 6.3, some reports |
| (10) | <u>Ch07: Eigenvalues and Eigenvectors</u> <ul style="list-style-type: none"> • Eigenvalues and eigenvectors | Homework Ex 7.1 |
| (11) Second examination | <ul style="list-style-type: none"> • Diagonalization • Powers of a matrix | Homework Ex 7.2 |
| (12) | <u>Ch08: Linear Transformations</u> <ul style="list-style-type: none"> • General Linear Transformations | Homework Ex 8.1 |
| (13) | <ul style="list-style-type: none"> • Kernel and Range | Homework Ex 8.2 |
| (14) | <ul style="list-style-type: none"> • Inverse Linear Transformations | Homework Ex 8.3 |
| (15) Specimen examination (Optional) | <ul style="list-style-type: none"> • Matrices of Linear Transformations | Homework Ex 8.4, reports |
| (16) Final Examination | Review and Exercises | |

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module references:

Books :

- Linear Algebra and its applications by Howard Anton _Addison Wesley 2002.
- Linear Algebra by L.W.Jhonson&R.D.Riess&J.t.arnold- Addisson Wesley 2007.
- Linear Algebra by Eric Carlen_ Freeman 2007
- Linear Algebra and its applications by Gilbert Strang _Belmont,CA 2006
- Linear Algebra and its applications by David C.Lay_ pearson/addisson wesly2006.

Journals:

- www.math.technion.ac.il
- [http://archives.math.utk.edu/topics/linear algebra.](http://archives.math.utk.edu/topics/linear%20algebra)
- www.elsevier.com/wps/find/journaldescription.cws-home
- www.ilasic.math.uregina.ca/iic/journal

Websites:

- www.numbertheory.org/book
- <http://ocw.mit.edu/ocwweb/mathematics>.....(video lectures).
- <http://en.wikipedia.org/wiki/Linear-algebra>.....(several links and text books)

STUDENT SOLUTIONS MANUAL TO ACCOMPANY Elementary Linear Algebra with Applications NINTH EDITION Howard Anton
Chris Rorres Drexel University Prepared by Christine Black Seattle University Blaise DeSesa Kutztown University Molly Gregas Duke
University Elizabeth M. Grobe Charles A. Grobe, Jr. Bowdoin College JOHN WILEY & SONS, INC. Cover Photo: ©John
Marshall/Stone/Getty Images Copyright © 2005 John Wiley & Sons, Inc. All rights reserved. Access Elementary Linear Algebra 9th
Edition solutions now. Our solutions are written by Chegg experts so you can be assured of the highest quality! Our interactive player
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book. Hit a particularly tricky question? Bookmark it to easily review again before an exam. Elementary Linear Algebra. SIXTH EDITION.
RON LARSON The Pennsylvania State University. The Behrend College DAVI D C. FALVO The Pennsylvania State University The
Behrend College. Students embarking on a linear algebra course should have a thorough knowledge of algebra, and familiarity with
analytic geometry and trigonometry. We do not assume that calculus is a prerequisite for this course, but we do include examples and
exercises requiring calculus in the text. These exercises are clearly labeled and can be omitted if desired. Many students will encounter
mathematical formalism for the first time in this course. As a result, our primary goal is to present the major concepts of linear algebra
clearly and concisely.