



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

Course Syllabus

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 method 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)