Philadelphia University
Faculty of Science
Department of Basic Sciences and Mathematics
First Semester, 2020/2021

Course Syllabus

Course Title: Linear Algebra 1	**Course code: 250241**
Course Level: 1	**Course prerequisite (s) and/or corequisite (s): 250101**
Lecture Time: **Sun, Tue., Thur.. 11:10-12:00**	**Credit hours: 3 credit hours**

Academic Staff Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address
Dr. Rola Alseidi	**Assist.Prof.**	**812** **Faculty of Engineering**		ralseidi@philadelphia.edu.jo

Course module description:

It includes the study of System of Linear Equations, Gaussian Elimination, Methods to Find A^{-1}, Matrices, Determinants, Euclidean Vector spaces, General Vector spaces, Subspaces, Linear Independence and Dependent Basis, Dimension, Row Space, Column Space, Null Space, Theory and Applications.

Course module objectives:

- **To enable the students to carry on Matrix Operations.**
- **To enable students to solve Systems of Linear Equations using Matrices, and Gaussian Elimination.**
- **To understand the concepts of Vector Spaces.**
- **To understand Subspaces, and Basis.**
- **To carry on Row Space, Column Space, and Null Space.**

Course/ module components

Text Book

Title: Elementary Linear Algebra 11th Edition.
Author Howard Anton, Chris Rorres
Publisher: Wiley 2015

- **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

Allocation of Marks	
Assessment Instruments	**Mark**
Mid-Term	**30%**
Final examination: 40 marks	**50%**
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)	**CH01:Systems of Linear Equations And Matrices** **1.1 Introduction to Systems of Linear Equations**	**Homework Ex 1.1**
(2)	**1.2 Gaussian Elimination**	**Homework Ex 1.2**
(3)	**Matrices and Matrix Operations** **Inverses; Algebraic Properties of Matrices**	**Homework Ex 1.3,1.4**
(4)	**1.5 Elementary Matrices and a Method for Finding A^{-1}**	**Homework Ex 1.5**
(5)	**1.6 More on Linear Systems and Invertible Matrices**	**Homework Ex 1.6**
(6)First examination	**1.7 Diagonal, Triangular, and Symmetric Matrices** **Ch02: Determinants** **2.1 Determinants by Cofactor Expansion**	**Homework Ex 1.7** **Homework Ex 2.1**
(7)	**2.2 Evaluating Determinants by Row Reduction**	**Homework Ex 2.2**
(8)	**2.3 Properties of the Determinants; Cramer's Rule**	**Homework Ex 2.3**
(9)	**CH03: Euclidean Vector Spaces** **3.1 Vectors in 2-Space, 3-Space, and n-Space**	**Homework Ex 3.1**
(10)	**3.2 Norm, Dot Product, and Distance in R^n**	**Homework Ex 3.2**
(11) Second examination	**3.3 Orthogonality**	**Homework Ex 3.3**
(12)	**Ch04: General Vector Spaces** **Real Vector Spaces** **Subspaces**	**Homework Ex 4.1, 4.2**
(13)	**Linear Independence** **Coordinates and Basis**	**Homework Ex 4.3, 4.4**
(14)	**Dimension** **Change of Basis**	**Homework Ex 4.5,4.6**
(15) Specimen examination (Optional)	**Row Space, Column Space, and Null Space** **Rank, Nullity, and the Fundamental Matrix Spaces**	**Homework Ex 4.7,4.8**
(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 with applications by Leon, Steven J., 9th ed. Boston: Pearson Education Limited, 2015.**
- **Linear Algebra by L.W. Jhonson & R.D. Riess & J.T. Arnold- Addisson Wesely 2007.**
- **Linear Algebra by Eric Carlen_ Freeman 2007**
- **Linear Algebra and its applications by Gilbert Srang_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.**
- **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).**