Philadelphia University

Faculty of Engineering - Department of Communications and Electronics Engineering

Course Information

Title: Fundamentals of Engineering Analysis (650163)

Prerequisite: Calculus 2 (250102)

Credit Hours: 3 credit hours (16 weeks per semester, approximately 48 contact hours)

Textbook: "Advanced Engineering Mathematics", Tenth Edition, Erwin Kreyszig, 2011

References: "Advanced Engineering Mathematics", R.C. Wylie and L.C. Barrett, 1995

"Complex Variables and Applications", J. Brown and R. Churchill, 2004

Catalog Description: The course aims to provide students with the ability to understand and deal with Linear Algebra including Matrices, Vectors, Determinants and Linear Systems, as well as Vector Differential Calculus such as Gradients, Diversion, and Curl operations.

Course Topics

Week	Topic
1	Course Introduction, Complex numbers and functions
2, 3	Introduction to Matrices, Matrix Arithmetics, Determinants
4, 5	Matrix inversion — Adjugate method — Gauss Elimination method
6	Types of Real and Complex Matrices
7 – 9	Solutions of Linear Systems of Equations — Gauss Elimination Method — Lower and Upper Decomposition — Cramer's Rule — Matrix Inversion
10, 11	The Eigenvalue Problem, Eigenvalues and Eigenvectors
12	Matrix Diagonalization
13	Introduction to Vectors, Vector Arithmetics
14	Inner and Vector Product Applications
15	The Gradient, The Divergence, The Curl
16	The Gradient, Divergence, and Curl Applications

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, students should be able to:

1.	Use mathematical techniques to solve linear systems	[a, e]
2.	Understand the basic and elementary aspects of linear algebra and complex numbers	[a]
3.	Formulate and solve Eigenvalue and matrix diagonalization problems	[a , e]
4.	Use vector differential calculus to solve engineering problems	[a , e]
5.	Relate mathematical techniques to real engineering applications	[a , e]

Assessment Instruments:

Evaluation of students' performance (final grade) will be based on the following categories:

Exams: Two in class written midterm exams will be given. Each will cover about 5-weeks of lectures.

Quizzes: At least 3 ten minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lectures.

Homework: Weekly problem sets will be given to students with the exception of weeks that include an exam or quiz. Homeworks should be solved individually and submitted in class on their due dates.

Final Exam: The final exam is comprehensive and will cover all the class material.

Grading policy:

First Exam	20%
Second Exam	20%
Homework and Quizzes	20%
Final Exam	40%
Total:	100%

Attendance policy:

Absence from classes 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.

February, 2017