



Philadelphia University

Faculty of Engineering - Department of Computer Engineering
First Semester 2022/2023

Course Details:

- Title:** Engineering Analysis II (0610262)
- Prerequisite:** Linear Algebra and Vector Calculus (250205)
- Credit Hours:** 3 credit hours (16 weeks per semester, approximately 44 contact hours)
- Textbook:** “Applied Numerical Methods with MATLAB for Engineers and Scientists”, by Steven Chapra. Third Edition 2012
- References:** “Numerical Methods Using Matlab”, by J. Mathews and K. Fink 4th ed. 2004
“Advanced Engineering Mathematics”, Erwin Kreystzig, 10th ed. 2011.
- Course Description:** This course introduces students to the various numerical methods used for solving mathematical problems such as: non-linear equation, systems of linear equations, numerical integration and differentiation, solution of differential equations, and curve fitting techniques.
- Website:** <https://www.philadelphia.edu.jo/academics/anazer/>
- Instructor:** Eng. Anis Nazer
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Course Outline:

Week	Topic
1	Introduction
2	Error Calculation and Analysis
3, 4	Solution of Non-Linear equation: Bisection, False position, Newton Raphson
5, 6	System of Linear equations: Gauss-Seidel Iterations Eigenvalues and Eigenvectors
7, 8, 9	Interpolation: Lagrange, Newton Curve Fitting: Least square, Linearization
10, 11	Numerical Integration: Trapezoidal, Simpson
12, 13	Differential equations: Euler, Heun, midpoint (Runge-Kutta)
14, 15	Numerical Derivative
16	Review, and final exam

Course Learning Outcomes with reference to ABET Outcomes:

Upon successful completion of this course, the student should:

1.	Understand the role of numerical methods in engineering	[1,7]
2..	Understand the errors present in numerical calculations	[1]
3.	Solve non-linear equations and Solve systems of linear equations numerically	[1]
4.	Apply curve fitting techniques to a set of data points	[1, 6]
5.	Perform numerical integration and differentiation	[1]
6.	Solve first order differential equations numerically	[1]

Assessment Guidelines:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

Sub-Exams: The students take a scheduled midterm written exam during the semester. The midterm will cover materials given in lectures in the previous 6-7 weeks.

Quizzes: Quizzes of (10-15) minutes will be conducted during the semester.

Homework: Homework problems will be given to students. Homework should be solved individually and submitted before the due date.

Cheating by copying homework or project from others is strictly forbidden and punishable by awarding the work with zero mark.

Course Participation: Discussions will be carried out during lectures. Individual students will be assessed accordingly.

Final Exam: The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

Grading Policy:

Midterm	30%
Course work activities - Quizzes - Assignments -Discussions	30%
Final Exam	40%
Total:	100%

Attendance Regulation:

The semester has in total 45 credit hours. Total absence hours from classes and tutorials must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.