Philadelphia University

Faculty of Engineering and Technology
Department of Mechanical Engineering

Course Information

Course Title:	**APPLIED ENGINEERING MATHEMATICS 0620301**
Prerequisite:	Math 0650260
Credit Hours:	3 credit hours (16 weeks per semester, approximately 44 contact hours)
Textbook:	Advanced engineering mathematics , Erwin keryszig , tenth edition,2012
References:	Mathematical methods for physics and engineering K.F. Riley , M.P Hobson and Pence , 2008
Course Description:	Differential equations first order , second order and higher order types and solution with applications , linear algebra and vector calculus, partial differential equations types and solution with applications , complex numbers , analysis with applications .
Course requirements:	Computer, internet connection, webcam, and Matlab software
Instructor:	**Prof. Adnan D. Mohammed** **Office**: Mechanical Engineering building, room E61206 , ext. : 2543 **Office hours**:

Course Topics:

Week	Topic
1	Introduction to applied engineering mathematics
2,3	Ordinary differential equations , first order , linear and nonlinear with applications
4,5	Second order differential equations , linear, nonlinear , and systems of ODE and engineering applications
6,7	Higher order DE, and series solutions of ODE , Bessel equation and Legendre equation
8 , 9	Principles of linear algebra, vector spaces, matrices, determinant, linear systems, linear transformation matrix inverse, symmetric, skew, orthogonal matrices.
10 , 11	Linear algebra , linear systems , Eigen values , Eigen vectors , vector calculus , gradient , divergence , curl , surface integral , green and stokes theorem and applications
12 , 13	Complex numbers , analysis , differentiation and integration with applications

14 , 15	Statistics , data representation, random variables , variance ,normal distribution , random distribution , an probability
16	Review an final exam

ABET Student Outcomes (SOs)

1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Course Learning Outcomes and Relation to ABET Student Outcomes:

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

1.	Classify the different types of differential equations	[1 , 2]
2.	Understand the concept linear, nonlinear ordinary and partial differential equations and their applications .	[1 , 2]
3	Construct and solve the differential equations for different engineering applications.	[1 , 2]
4.	Ability to classify linear and nonlinear , dependent and independent systems	[1 , 2]
5	Analyze space transformation equations, and different matrices operations.	[1 , 2]
6	Analyze and solve complex number, equations, differentiation, integration and applications.	[1 , 2]
7	Effectively communicate in writing an assignment and solve specified home works in teams.	[5]
8	Construct a computer program to solve a given problems using software.	[7]
9	Be able to analyze , use statistics and probability theories in engineering applications	[1]

Teaching methodology: Online, Blended or both

Electronic platform: Microsoft-teams

Evaluation methods:

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

Mid-term Shall be given at the end of the seventh week of the course in the

exam: form of multiple choice questions and (or) specific problems to be solved and uploaded by the student using the University electronic platform.

Quizzes: A number of 10-minute quizzes in the form of multiple choice questions or an assignment using the University electronic platform. will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

Homework: Problem sets will be given to students in the form of assignments using the University Electronic platform. Homework should be solved by each student individually and submitted using the platform before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

Participation: Questions will be asked during the online session (lecture) and the student is assessed based on his/her response

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

Grading policy:

Mid-term Exam.	30%
Home works, Quizzes and participation	30%
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.

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