# Philadelphia University

**Faculty of Engineering & Technology**

Department of Electrical Engineering

First Semester 2025/2026

## Course Information

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| **Course Title:** | Engineering Analysis 1 (0610260) |
| **Prerequisite:** | Differentiation and integration 2 (0250102) |
| **Credit Hours:** | 3 credit hours (16 weeks per semester, approximately 44 contact hours) |
| **Textbook:** | Advanced Engineering Mathematics By:Erwin Kreyszig 10th edition, 2011 |
| **References:** | • Boyce, William E., DiPrima, Richard C., Elementary Differential Equations, ninth Edition, Wiley, New York, 2009.<br>• Rabenstein, Albert L., Elementary Differential Equations with linear Algebra, Third Edition, Academic Press, New York, 1982.<br>• Krusemeyer, Mark, Differential Equations, Macmillan Publishing Co., New York, 1994.<br>• Simmons, George F., Differential Equations with Applications and Historical Notes, third edition, Taylor & Francis Group, LLC, 2017<br>• الدكتور عبد الرحمن القواسمي و المهندسة ندى نبيل الخطيب " المعادالت التفاضلية تطبيقاتها الهندسية" الطبعة االولى، طبع بدعم من جامعة فيالدلفيا، مطبعة الخط العربي 2011<br>• http://www.sosmath.com/diffeq/diffeq.html |
| **Website:** | https://www.philadelphia.edu.jo/academics/zalatari/ |
| **Course Description:** | The course is a requirement for all engineering students. It introduces the fundamental of ordinary differential equations and the most important methods for solving them with emphasis on applied problems in engineering and physics. The Laplace transform and power series are presented as an alternative method for solving the ordinary differential equations. |
| **Instructors:** | Dr. Zaid Al-Atari |
| **Course Coordinator:** | Dr. Zaid Al-Atari |
| **Technology Requirements:** | • Personal computer, laptop, or mobile phone.<br>• Internet Connection.<br>• Access to Philadelphia University E-Learning Portal (MS Teams and Moodle) |
| **Learning Style:** | (F2F; Blended; or Online): Blended |
| **Communication:** | • Announcement: the announcements will be posted in MS Teams or Moodle on a regular basis.<br>• Email.<br>• MS Teams or Moodle chats. |
| **Course Objectives:** | • Solve first and second order differential equation<br>• Solve higher order differential equation<br>• Laplace and inverse Laplace transformation<br>• Power series method |

| Course Learning Outcomes (CLO) and Relation to ABET Student Outcomes | | |
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| **CLOs** | **Outcomes** | **ABET PLOs** |
| **K1, K2** | Understand Basic concepts and the elementary of DE | 1 |
| **K1, K2, S3** | Be able to distinguish the appropriate methods to solve DE | 1 |
| **K1, K2, S3** | Use fundamental knowledge to analyze and solve different engineering models. | 1 |
| **K1, K2** | Able to use Laplace Transform and power series to solve DE. | 1 |

| Grading Policy and Assessment Instruments | | | | | |
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| **Graded Item** | **Marks** | **Topic (s)** | **CLO(s)** | **Learning Portal** (Teams/ Moodle/ F2F/ Others) | **Week** |
| Assignment 1 | 5 | Second Order Differential Equations | 2 | Moodle | 6 |
| Assignment 2 | 5 | Laplace Transform | 3 | Moodle | 9 |
| Quiz 1 | 5 | First Order Differential Equations | 3 | F2F | 4 |
| Quiz 2 | 5 | Power Series Method | 1 | F2F | 10 |
| Participation | 10 | Discussed in class | 1-5 | F2F | 12 |
| Mid Exam | 30% | Weeks 1-8 | 1,2,3 | F2F | 8 |
| Final Exam | 40% | Week 1-15 | 1-5 | F2F | 16 |
| **Total Marks** | **100%** | | | | |

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| **Notes:** | • Two written exams will be given.<br>• Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero marks for that homework.<br>• Quizzes: 10-minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).<br>• Homework: Problem sets will be given to students. Homework should be solved individually and submitted before the due date.<br>• The final exam will cover all the class material. |

| Course Content: Learning Resources/ References/ Activities/ Assessment Methods | | | | | | |
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| **Week** | **Lecture** | **Topic** | **CLOs** | **Learning Resources/ References/ Activities (Learning and Teaching Methods)** | **Learning Style** (F2F, Synchronous, Asynchronous) | **Assessment Method** |
| **1** | **L1** | Basic Concepts | K1 | Lecture Notes + Moodle | F2F | |
| | **L2** | Differential Equations order and degree | K2 | Lecture Notes + Textbook 1.1 | F2F | |
| | **L3** | Introduction to DE | K1<br>K2 | Recorded video + Moodle | Asynchro nous | |
| **2** | **L1** | First order DE (separable) | K2<br>S3 | Lecture Notes + Textbook 1.1 | F2F | |
| | **L2** | First order DE (non-separable) | K2<br>S3 | Lecture Notes + Textbook 1.3 | F2F | |
| | **L3** | First order review | K1<br>K2 | Recorded video + Moodle | Asynchro nous | |
| **3** | **L1** | First order DE (exact) | K1 | Lecture Notes + Textbook 1.3 | F2F | |
| | **L2** | First order DE (exact) | K2 | Lecture Notes + Textbook 1.4 | F2F | |
| | **L3** | First order examples | S3 | Online lecture on Teams | Synchron ous | |
| 4 | **L1** | First order DE (non-exact) | K1 | Lecture Notes + Textbook 1.4<br>Quiz 1 | F2F | |
| | **L2** | First order DE (non-exact) | K2 | Lecture Notes + Textbook 1.5 | F2F | HW |
| | **L3** | Bernoulli Equation | K1 | Recorded video + Moodle | Asynchro nous | |
| 5 | **L1** | Second order DE 1 | K2 | Lecture Notes + Textbook 1.5 | F2F | |
| | **L2** | Second order DE 2 | K1 | Lecture Notes + Textbook 1.5 | F2F | Quiz |
| | **L3** | Second order Example | K1 | Recorded video + Moodle | Asynchro nous | |
| 6 | **L1** | Second order DE (homogeneous) | K2 | Lecture Notes + Textbook 2.1 | F2F | |
| | **L2** | Second order DE (homogeneous) | K1 | Lecture Notes + Textbook 2.2<br>Homework 1 | F2F | |
| | **L3** | Second order DE Example | K1 | Recorded video + Moodle | Asynchro nous | |
| 7 | **L1** | Second order DE (non homogeneous) | S3 | Lecture Notes + Textbook 2.1, 2.2 | F2F | |
| | **L2** | Second order DE (non homogeneous) | K2 | Lecture Notes + Textbook 2.7 | F2F | |
| | **L3** | Second order DE review | K1 | Recorded video + Moodle | Asynchro nous | |
| 8 | **L1** | Modelling 1 | K1 | Lecture Notes + Textbook 2.7 | F2F | |
| | **L2** | Modelling 2 | K2 | Lecture Notes + Textbook 2.7<br>Midterm Exam | F2F | Quiz |
| | **L3** | Review modelling | K2 | Online lecture on Teams | Synchron ous | |
| 9 | **L1** | Electrical Applications of DE | K2 | Lecture Notes + Textbook 3.1 | F2F | |
| | **L2** | Mechanical Applications of DE | K1 | Lecture Notes + Textbook 3.1 | F2F | HW |
| | **L3** | Other applications | K2 | Recorded video + Moodle | Asynchro nous | |
| 10 | **L1** | Higher order DE 1 | S3 | Lecture Notes + Textbook 3.2<br>Quiz 2 | F2F | |
| | **L2** | Higher order DE 2 | S3 | Lecture Notes + Textbook 6.1 | F2F | |
| | **L3** | Higher order DE example | K2 | Recorded video + Moodle | Asynchro nous | |
| 11 | **L1** | Laplace Transform 1 | K1 | Lecture Notes + Textbook 6.2 | F2F | |
| | **L2** | Laplace Transform 2 | K1 | Lecture Notes + Textbook 6.3 | F2F | |
| | **L3** | Inverse Laplace 1 | K1 | Online lecture on Teams | Synchron ous | |

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| 12 | **L1** | Inverse Laplace 2 | K2 | Lecture Notes + Textbook 6.3 | F2F | |
| | **L2** | Laplace Prosperities 1 | K2 | Lecture Notes + Textbook 6.3 Homework 2 | F2F | |
| | **L3** | Laplace Prosperities 2 | K1 K2 | Recorded video + Moodle | Asynchro nous | |
| 13 | **L1** | Shifted data problem | S3 | Lecture Notes + Textbook 6.6 | F2F | |
| | **L2** | Unit step Function | K2 | Lecture Notes + Textbook 6.6 | F2F | |
| | **L3** | Short impulses function | K1 K2 | Recorded video + Moodle | Asynchro nous | |
| 14 | **L1** | Integration of transform | K1 | Lecture Notes + Textbook 6.6 | F2F | |
| | **L2** | Differentiation of transform | K1 | Lecture Notes + Textbook 6.7 | F2F | |
| | **L3** | Power series method introduction | K1 K2 | Recorded video + Moodle | Asynchro nous | |
| 15 | **L1** | Power series method 1 | S3 | Lecture Notes + Textbook 5.1 | F2F | |
| | **L2** | Power series method 2 | K1 | Lecture Notes + Textbook 5.1 | F2F | |
| | **L3** | Power series method 3 | K1 K2 | Online lecture on Teams | Synchron ous | |
| 16 | **L1** | Course Review and final exams | K1 K2 | Lecture Notes + Textbook 5.1 | F2F | |
| | **L2** | Course Review and final exams | K1 K2 | Lecture Notes + Textbook 5.1 | F2F | |
| | **L3** | Course Review and final exams | S3 K2 | Online lecture on Teams | Synchron ous | |

| **Credit Hours Distribution Report** | |
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| **Learning Style** | **Contact Hours** |
| F2F | 32 |
| Asynchronous | 12 |
| **Total** | 44 |

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| **Academic Honesty/ Student Conduct** | ○ As a student at Philadelphia University, you are expected to follow the university regulations and guidelines for academic honesty/student conduct found in student handbook.<br>○ This means that you should not cheat, plagiarize and let another student use your account in LMS learning portals. |
| **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. |

October 2025