Course Unit Title	Differential Equations
Course Unit Code	MAT201
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	4
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	4
Practice (hour/week)	-
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Assist. Prof. Dr. Ali Denker
Name of Lecturer (s)	Assist. Prof. Dr. Ali Denker
Name of Assistant (s)	-
Mode of Delivery	Face to Face.
Language of Instruction	English
Prerequisites	MAT101, (CALCULUS I)
Recommended Optional Programme Components	

Course description:

Ordinary and partial differential equations. Explicit solutions, Implicit Solution. First-order differential equations, separable, homogenous differential equations, exact differential equations. Ordinary linear differential equations. Bernoulli differential equations. Cauchy-differential equations. High-order ordinary differential equations. Introduction to Laplace transforms. Introduction to series method for solving differential equations

Objectives of the Course:

1. Introducing first, second and higher order differential equations, and the methods of solving these equations.
2. Emphasizing the important of differential equations and its engineering application.
3. Introducing the Laplace transform and its applications in solving differential equations and other engineering applications.
4. Introducing the series method in solving differential equations.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Learning the definition of differential equation and the classification of differentional equations.	1
2	Learning the method of solving different types of differentials and its applications.	1, 2
3	Learning the concepts of Laplace transform and its applications.	1, 2
4	Learning the series methods for solving differential equations.	1, 2

Assessment Methods: 1. Written Exam, 2. Assignment, 3. Project/Report, 4. Presentation, 5. Lab. Work

Course's Contribution to Program

		CL
1	Apply knowledge of mathematics, natural science with relevant to life science and multidiscilinary context of engineering science.	5
2	Anaylze, design and conduct experiments, as well as to analyze and interpret data.	2
3	Design a system, component or process to meet desired needs within realistic constructions such as economics, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	1
4	Function on multidisciplinary teams.	3
5	Control in design work, by using simulation, modeling and tests and integration in a problem solving oriented way.	1
6	Display an understanding of professional and ethical responsibility.	2
7	Communicate effectively aware of non-technical effects of engineering.	1
8	Search technical literature and other information sources	1
9	Recognize of the need for, and an ability to engage in life-long learning.	2
10	Exhibit knowledge of contemporary issues.	2
11	Use the techniques, skills and modern engineering tools necessary for engineering practice to develop marketable products for the global market.	1

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Assessment
1	1	The nature of differential equations, definition, ordinary and partial differential equations, order and degree, linear and nonlinear equations.	Assignment 1
2	1	Separable equations and Homogeneous equations.	Assignment 2
3	1	Exact equations, and integrating factors,	Assignment 3
4	1	Linear equations, and Bernoull's equation, and initial value problems.	Assignment 4
5	2	Applications: simple electric circuits and free falling problems, parachute problem, radium decomposition and tank of water problem.	Assignment 5
6	2	Reduction of order and knowing one solution to find another solution and the general solution of second order linear differential equation.	Assignment 6
7			Midterm Exam
8	3	Introduction, the general solution of the homogeneous equation, and the general solution of nonhomogeneous differential equation.	
9	3	The homogeneous equation with constant coefficients and the solution of Euler's equidimensional equation.	Assignment 7
10	3	The method of undetermined coefficients for finding the particular solution.	
11	3	The method of variation of parameters for finding the particular solution and initial value problems.	Assignment 8
12	4	Laplace transform of continuous functions.	Assignment 9
13	4	Laplace transform of discrete functions.	Assignment 10
14	5	Introduction to solution by series.	Assignment 11

15			Final Exam.

Recommended Sources

Textbook:

Yunus A. Cengel, William J. Palm III**, '**Differential Equations for Engineers and Scientists', First edition, 2013 McGraw-Hill Higher Education.

Supplementary Course Material

- Dnnis G. Zill, Michael R. Cullin, Differential Equations with Boundary Value Problems, Seventh Edition, Brooks/Cole, Cengage Learning. Kenneth C. Louden, Programming Languages. Principles and Practice, Thomson, 2003.
- Fae'q A.A. Radwan, Linear Algebra and Differential Equations, Near East University, Nicosia, – Turkish Republic of Northern Cyprus, 1999.

Assessment

Attendance	5%	Less than 25% class attendance results in NA grade
Assignment	5%	
Midterm Exam	45%	Written Exam
Final Exam	45%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students may use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Near East University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including Exam weeks)	15	4	60
Labs and Tutorials	-	-	-
Assignment	11	2	22
Project/Presentation/Report	-	-	-
E-learning activities	5	2	10
Quizzes	-	-	-
Midterm Examination	1	2	2
Final Examination	1	2	2

Self Study	15	4	60
Total Workload			176
Total Workload/30(h)			5.76
ECTS Credit of the Course			6