COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Mathematics			**NQF level**	
Course Title	Ordinary Differential equation I	**Code**	505203	**Prerequisite**	Calculus 2
Credit Hours	3	**Theory**	3	**Practical**	-
Course Leader	Dr. Belal Batiha	**email**	b.bateha@jadara.edu.jo		
Lecturers	Dr. Belal Batiha	**emails**	b.bateha@jadara.edu.jo		
Lecture time	10:00-11:30	**Classroom**	D406		
Semester	First	**Production**		**Updated**	2021
Awards				**Attendance**	Fulltime

Short Description
Solutions of differential equations (first order, second order, and higher orders) with applications to mechanics and physics, series solutions.
Course Objectives
1- Model some real-life problems using ODEs and 2nd ODEs.   2- Solve some special types of ODEs, such as first order ODEs, Linear ODEs, Cauchy Euler ODEs.   3- Use series solutions to solve ODEs.

Learning Outcomes
A. Knowledge - Theoretical Understanding
a1) Define the basic concepts of ordinary differential equation (ODE).
B. Knowledge - Practical Application
a2) Find solution of the linear differential equations.
C. Skills - Generic Problem Solving and Analytical Skills
b1) Find an ODEs whose solution is a given function.
D. Skills - Communication, ICT, and Numeracy
b2) Solve linear ODE's.
E. Competence: Autonomy, Responsibility, and Context
Teaching and Learning Methods
Lectures, discussions, and solving selected problems.
Assessment Methods
Assignments, Exams, Quizzes, Discussion and Interaction

			Course Contents		
W	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1	**3**	a1,	Introduction	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
2	**3**	a1, a2, b1, b2	**First Order DE** Exact Equations Integrating Factors	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
3	**3**	a1, a2, b1, b2	Separable Equations Homogeneous Equations	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
4	**3**	a1, a2, b1, b2	Linear Equations Bernoulli's Equations	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
5	**3**	a1, a2, b1, b2	**Second Order DE** Linear Equations	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
6	**3**	a1, a2, b1, b2	Homogeneous Equations	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
7	**3**	a1, a2, b1, b2	Homogeneous Linear Equations with Constant Coefficients	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
8	**3**	a1, a2, b1, b2	The Method of Undetermined Coefficients	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
9	**3**	a1, a2, b1, b2	Variation of Parameters The Cauchy-Euler Equidimensional Equation	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
10	**3**	a1, a2, b1, b2	Reduction of Order	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
11	**3**	a1, a2, b1, b2	**Higher order DE.** Homogeneous Equations with Constant Coefficients	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
12	**3**	a1, a2, b1, b2	The Method of Undetermined Coefficients	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
13	**3**	a1, a2, b1, b2	**Series solutions of DE** Introduction to Power Series	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
14	**3**	a1, a2, b1, b2	Powe Series Solution of DE First order equations	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
15	**3**	a1, a2, b1, b2	Powe Series Solution of DE Second order equations	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction
16	**3**	a1, a2, b1, b2	**A Few Applications**	Lecture in the classroom	Assignments, Exams, Quizzes, Discussion and Interaction

Infrastructure	
Textbook	Elementary Differential Equation, By: W. E. Boyce and R.C. Diprima 9th. ed.
References	1. Elementary Differential Equations with boundary value problem by C. H. Edwards, R. and David E. Penney, 3rd ed. 2. Introduction to Differential Equations, by Richarcl K. Miller. Latest ed. 3. A first course in Differential equations with Applications, 4th ed.
Required reading	
Electronic materials	
Other	

Course Assessment Plan					
Assessment Method	**Grade**	**CLOs**			
		a1	**a2**	**b1**	**b2**
First (Midterm)	**30%**	5	10	10	5
Second (if applicable)	**20%**				
Final Exam	**50%**	10	10	10	20
Coursework					
Coursework assessment methods — Assignments	**10%**	5		5	
Coursework assessment methods — Case study	-				
Coursework assessment methods — Discussion and interaction	**-**				
Coursework assessment methods — Group work activities	-				
Coursework assessment methods — Lab tests and assignments	-				
Coursework assessment methods — Presentations	-				
Coursework assessment methods — Quizzes	**-**		5	5	
Total	**100%**	20	25	30	25

Plagiarism
Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code). Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.