



**Jordan University of Science and Technology**  
**Faculty of Science & Arts**  
**Mathematics Department**

MATH203 Ordinary Differential Equations

Summer Semester 2021-2022

**Course Catalog**

3 Credit Hours. Introductions, classification, first order differential equations, applications. Differential equations of higher order and their solutions. Applications, solutions by series near ordinary points, Solving IVPS using Laplace transform. Linear systems of differential equations.

**Text Book**

<b>Title</b>	Fundamentals of Differential Equations.
<b>Author(s)</b>	R. Nagle, E. Saff and A. Snider
<b>Edition</b>	8th Edition
<b>Short Name</b>	TextBook
<b>Other Information</b>	

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
Ref 1	A First Course in Differential Equations with Applications,	D. G. Zill	10th Edition	
Ref 2	Elementary Differential Equations	E.D. Rainville and P.E. Bedient	4th Edition	

**Instructor**

Name	<b>Mrs. Inam Nuseirat</b>
Office Location	-
Office Hours	Sun : 13:00 - 14:30 Mon : 13:00 - 14:30 Tue : 13:00 - 14:30 Wed : 13:00 - 14:30

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Instructor	
Name	<b>Prof. Mahmoud Alrawashdeh</b>
Office Location	-
Office Hours	Sun : 10:00 - 11:30 Mon : 10:00 - 11:30 Tue : 10:00 - 11:30 Wed : 10:00 - 11:30
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Instructor	
Name	<b>Farah Ababneh</b>
Office Location	-
Office Hours	
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Class Schedule & Room
<p>Section 1: Lecture Time: Sun, Mon, Tue, Wed : 08:30 - 10:00 Room: NG54</p> <p>Section 2: Lecture Time: Sun, Mon, Tue, Wed : 08:30 - 10:00 Room: NG43</p> <p>Section 3: Lecture Time: Sun, Mon, Tue, Wed : 10:00 - 11:30 Room: SF05</p> <p>Section 4: Lecture Time: Sun, Mon, Tue, Wed : 11:30 - 13:00 Room: NG43</p> <p>Section 5: Lecture Time: Sun, Mon, Tue, Wed : 13:00 - 14:30 Room: SF07</p>

Prerequisites		
Line Number	Course Name	Prerequisite Type
901020	MATH102 Calculus 2	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	Topic	References

Week 1	Introduction. Solutions and Differential Equations and Initial Value Problems. Existence and Uniqueness Theorem. First Order Differential equations and Separable Equations. .	From TextBook
Week 2	Linear Equations, Exact Equations and Special Integrating Factors. Bernoulli Equation, Homogeneous Equations and Clairaut Equation	From TextBook
Week 3	Substitutions and Transformations. Orthogonal Trajectories. Higher order Differential Equations. Linear Differential Operators. Fundamental Solutions of Differential Equations. Homogeneous Linear Equations with Constant Coefficients	From TextBook
Week 3	Cauchy Euler Equations and Reduction of Order. Auxiliary Equations with Complex Roots. Methods of Undetermined Coefficients. Methods of Variation of Parameters.	From TextBook
Week 4	Mechanical Vibrations and Simple Harmonic Motion. Damped Free and Forced Vibrations. Definition of Laplace Transform. Properties of Laplace Transform and Its Inverse	From TextBook
Week 5	Solving Initial Value Problems Using Laplace Transform. Power Series. Radius Of Convergence and Ordinary and Singular Points.	From TextBook
Week 6	Series Solution of Differential Equations. Review of Matrices and Vectors Linear Systems in Normal Form. Homogeneous Systems with constant Coefficients	From TextBook
Week 7	Nonhomogeneous Linear Systems.	From TextBook
Week 8	Final Exam	

Mapping of Course Outcomes to Program Student Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Be able to identify, formulate and solve first order linear differential equations and their applications. [1SLO1]	25%	Final Exam, midterm exam
Be able to use the Auxiliary equation and reduction of order to solve homogeneous higher order linear DE's, and to use the method of undetermined coefficients and the variation of parameters method to solve differential equations. [2SLO1, 1SLO2]	30%	
Be able to use Laplace transforms and their inverses to solve differential equations. [3SLO1, 2SLO2]	20%	
Be able to use the power series method to solve differential equations. [2SLO1, 1SLO2]	15%	
Be able to solve modeled problems using differential equations (Physical, chemical, or economic problems). [1SLO1, 1SLO2]	10%	

Relationship to Program Student Outcomes (Out of 100%)					
SLO1	SLO2	SLO3	SLO4	SLO5	SLO6
72	28				

Evaluation
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<b>Assessment Tool</b>	<b>Weight</b>
Final Exam	50%
midterm exam	50%

<b>Policy</b>	
Midterm exam	50
Final exam	50

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