



AMMAN - JORDAN

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جامعة كل العرب

### Course Syllabus

Faculty of -----Arts and Science-----

Academic Department ---Math Department-----

Academic Year --2021--- / -2022----- Semester: -----First-----

<b>Course Title :</b>	Ordinary Differential Equations
<b>Course No. :</b>	1721203
<b>Prerequisite :</b>	1501110
<b>Concurrent :</b>	none
<b>Department :</b>	Math
<b>Coordinator :</b>	Dr.Mayada abualhomos
<b>Mode of Instruction</b>	On -Campus

#### \* Instructor:

Lecturer	Office Phone	Room No.	Office Hours	E-mail
Dr.Mayada abualhomos	1442	225	9:30-12Monday,Wednesdays 30-12:2Sunday,Monday	<a href="mailto:abuhomos@asu.edu.jo">abuhomos@asu.edu.jo</a>

#### Course Description

Solutions of differential equations (first order, second order, and higher orders) with applications to mechanics and physics, series solutions, Laplace transform method.

#### Intended Learning Outcomes

Upon the completion of the course, this module should lead to the following learning outcomes:

##### **A. Knowledge and Understanding (Student should):**

- A1 Master the basic concepts of ordinary differential equation (ODE)
- A2 Select proper procedure to solve a given ODE.
- A3 Find series solution of 2nd order linear differential equations.

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- A4. Find Laplace and Inverse Laplace transforms of given functions.  
A5. Derive mathematical model containing ODE of a real life problems.

### B. Cognitive and Intellectual Skills (Student should):

- B1. Write down an ODE that represents a given model.  
B2. Find an ODEs whose solution is a given function.  
B3. Tell if an ODEs has a solution or not.

### Subject Specific Skills (Student should):

- C1. Solve linear ODE's.  
C2. Find Laplace transform and the inverse Laplace transform of given function:  
C3. Use Mathematical Packages to find analytical or Numerical solution of an ODE.-

### C. Transferable Skills (Student should):

- D1. Be involved in the process of illustrating concepts, building algorithms and exploring facts.  
D2. Make critical comments on obtained results.  
D3. Write reports, to be involved in general discussions with his class mates, and to do independent work.

### Program Learning Outcomes (PLOs):

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Course Learning Outcomes Alignment Matrix				
	CLO. 1	CLO. 2	CLO. 3	CLO. 4
PLO.1:	-	-	-	-
PLO 2:	-	-	-	-
PLO.3:	-	-	-	-
PLO.4:	-	-	-	-
PLO. 5	-	-	-	-



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Course Contents and Schedule

Week	Day and Date	Topics to be covered	Method of instruction	CLOs	PLOs
1	Mon. 18/10/2021	<b>Chapter1. Introduction</b> 1.1: Definition of a d.e 1.2Classification of a d.e	In-class lecture	A1,B1	-
	Wed. 20/10/2021		In-class lecture	A1,D1	
2	Mon. 25/10/2021	<b>Chapter2. First order d,e</b> 2.1linear and integrating factors 2.2 linear o,d 2.3seperable functions 2.5modeling with linear-equations	In-class lecture	A2,B3	-
	Wed. 27/10/2021		In-class lecture	A2,B3	
3	Mon. 1/11/2021	2.7 some problems in mechanics 2.8,exact equations 2.9homogeneous equations 2.10 miscellaneous problems	In-class lecture	A2,B3	-
	Wed. 3/11/2021		In-class lecture	A2,B3	
4	Mon. 8/11/2021	Chapter3 second order linear o,d 3.1homogeneous equations with constant coefficient 3.2fundamental solutions order	In-class lecture	A1,B1	-
	Wed. 11/11/2021		In-class lecture	A1,B1	



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5	Mon. 15/11/2021	3.4 complex roots	In-class lecture	A1,A2 A1,A5	-
	Wed.17/10/2021	3.5 repeated doots and reduction of 3.6 non-homogeneous equations	In-class lecture		
6	Mon. 22/11/2021	3.7 variation of parameters 3,8 mechanical and electronic Vibrations	In-class lecture	A1,B1 A1,B1	-
	Wed.24/11/2021	3.9 force equations	In-class lecture		
7	Mon. 29/11/2021	Chapter4higher o,d,e 4.1 general theory	In-class lecture	A3,C2 ,D1, D2	-
	Wed. 1/12/2021	4.2 1homogeneous equations with constant coefficient	In-class lecture		
8.	<b>MID Term Exam</b>				
9	Mon. 13/12/2021	3.5: Implicit differentiation Ex: <b>55–21, 24, 26, 37, 49-60, 75-78</b>	In-class lecture	A3,C2, D1	
	Wed. 15/12/2021	3.6: Derivatives of logarithmic functions Ex: <b>2-23, 26, 27, 29, 33, 41-52, 53, 55</b>	In-class lecture		
10	Mon. 20/12/2021	4.3 method of undetermined coefficients	In-class lecture	A3,C2, D1,D2	-
	Wed 22/12/2021	4.4 variation of parameters	In-class lecture		
11	Mon. 27/12/2121	<b>Chapter 5 series solutions of 2<sup>nd</sup>,o,d</b>	In-class lecture	B1,A5, D1,D2	-
	Wed. 29/12/2021	<b>5.1 review of power series</b> 5.2 series solutions near n ordinary point	In-class lecture		
12	Mon. 3/1/2022	5.4 Regular singular points	In-class lecture	A3,C1	-
	Wed. 5/1/2022	5.6 series solutions near a regular point1	In-class lecture		
13	Mon. 10/1/2022	5.6 series solutions near a regular point1	In-class lecture		-
	Wed. 12/1/2022	5.7 series solutions near a non regular point 2	In-class lecture		
14	Mon. 17/1/2022	Chapter 6:laplace transform 6.1 Definition of laplace transform	In-class lecture	A4,C2, A4,C2,	-
	Wed. 19/1/2022	6.2 solution of I.V by laplace transform	In-class lecture		
15	Mon. 24/1/2022	6.3 step function	In-class lecture	A4,C2, A4,C2	-
	Wed. 26/1/2022	6.4 differential equations with discontinuities	In-class lecture		
16.	<b>Final Exam</b>				



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## Grading Plan and Assessment Tools

Assessment Tools	Weights	Due date
Mid-term	30%	
Assignments	-	-
Quizzes	20%	-
Inter active lectures	-	-
Group Work	-	-
Presentation	-	-
Reports	-	-
Project	-	-
Case-Study	-	-
Final Exam	50%	

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## Supplementary Reading

### Textbook:

- 1- Elementary Differential Equation, By: W. E. Boyce and R.C. Diprima 7th. Ed.
- 2- Elementary Differential Equations with boundary value problem by C. H. Edwards, R. and David E. Penney, 3rd ed.

### References:

- 1- Introduction to Differential Equations, by Richard K. Miller. Latest ed.
- 2- First course in Differential equations with Applications, 4th ed.



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## جامعة كل العرب

**Subject Coordinator**      **Dr. Ahmad Sundookah**      **Signature:** -----

**Head of Curriculum Committee**      **Dr. Husam Miqdad**      **Signature:** -----

**Department Head**      **Dr. Husam Miqdad**      **Signature:** -----

**Faculty Dean**      **Dr. Hadeel Ali Saed**      **Signature:** -----

**Copy to:**

- Department Head.
- Head of Curriculum Committee.
- Course File.

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رمز النموذج: UF 28 / 2

رقم القرار 24 / 233

تاريخ الاعتماد 2021/10/18