


مختصر توصيف المقرر

(Course Information)

معلومات المقرر\*

	المعادلات التفاضلية في الفيزياء	اسم المقرر:
	فيز 2022	رقم المقرر:
	حساب التفاضل والتكامل رياض 1022	اسم ورقم المتطلب السابق:
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	الثالث	مستوى المقرر:
	(0+0+3)3	الساعات المعتمدة:
<b>Module Title:</b>	Differential Equations in Physics.	
<b>Module ID:</b>	PHYS 2022	
<b>Prerequisite:</b>	Calculus MTH 1022	
<b>Co-requisite:</b>	--	
<b>Course Level:</b>	3 <sup>rd</sup>	
<b>Credit Hours:</b>	3 (3+0+0)	

Module

وصف المقرر :

Description

This course provides students with an introduction to ordinary differential equations. Students will acquire the knowledge to understand branches in physics, which use differential equations; students will develop the ability to solve differential equations, which are common in physics.

Module Aims

أهداف المقرر :

1	Understanding the most important definitions and concepts of differential equations as order-degree-linearity- homogeneity and its classifications.	1
2	Modelling physical phenomena with first-order and second-order differential equations, to solve such equations using analytic, graphical, or numerical methods, and to analyze and communicate the results.	2
3	Using power series to solve differential equations.	3

Learning Outcomes:

مخرجات التعليم:

1	<b>Knowledge</b> <ul style="list-style-type: none"> <li>Rename the most important definitions and concepts of differential equations as order-degree-linearity- homogeneity.</li> <li>Classify the DE, Linear, nonlinear, exact, homogeneous, Bernoulli, Ricataau, Clairrot, Cauchy-Euler differential equations and the power series solutions.</li> </ul>	1
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2	<b>Cognitive Skills</b> <ul style="list-style-type: none"> <li>Using a several methods in solving DE.</li> <li>Apply different DE methods in physical problems.</li> <li>Introduce the physical problems in a mathematical model.</li> <li>Using power series to solve differential equations.</li> </ul>	2
3	<b>Interpersonal Skills and Responsibility</b> <ul style="list-style-type: none"> <li>Interact professionally with others, to engage effectively in teamwork, and to function productively on multidisciplinary group projects.</li> <li>Develop in each student the good writing skills so that they are able to communicate effectively and clearly</li> <li>Develop in each student good oral communication skills so that they are able to communicate effectively with others</li> </ul>	3
4	<b>Communication, Information Technology and Numerical Skills</b> <ul style="list-style-type: none"> <li>Develop the team working skills necessary to perform effectively.</li> <li>Develop the ability to argue scientifically with the instructor.</li> <li>Using the computer program to analyze the data, and make some simulation</li> <li>Search in the web for any updated information concerning the assigned experiment.</li> <li>Analyze the data with good mathematics and theory.</li> </ul>	4
5	<b>Psychomotor</b> Not applicable.	5

**Course Contents:**

محتوى المقرر:

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)
2	2	Basic definitions and construction of an ordinary differential equation.
9	3	Methods of Solving Ordinary differential equations of First Order. Orthogonal trajectories.
9	3	Ordinary differential Equations of High Orders With constant coefficient and with variable coefficients.
6	2	Types of solutions. Linear systems of ordinary differential equations
6	2	Series solutions of a Linear ordinary differential equation of Second Order with Polynomial coefficient.
9	3	Laplace Transform.

**Textbook and References:**

الكتاب المقرر والمراجع المساندة:

سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم الكتاب المقرر Textbook title
10 <sup>th</sup> ed. (2010) ISBN: 978-1-118-32361-8	John Wiley & Sons	William E. Boyce & Richard C. DiPrima	Elementary differential equations and boundary value problems.
سنة النشر	اسم الناشر	اسم المؤلف (رئيسي)	اسم المرجع

Publishing Year	Publisher	Author's Name	Reference
2 <sup>nd</sup> ed. (2017) ISBN-10: 3319502239	<i>Springer</i>	<i>Christian Constanda</i>	Differential Equations: A Primer for Scientists and Engineers
1 <sup>st</sup> de. (2004) ISBN-10: 0521533910	<i>Cambridge University Press</i>	<i>JAMES C. ROBINSON</i>	An introduction to ordinary differential equations.
5 <sup>th</sup> ed., (2004).	<i>Pearson Prentice Hall</i>	<i>Edwards, C. Henry, and David E. Penney</i>	Instructor's Solutions Manual ELEMENTARY DIFFERENTIAL EQUATIONS with BOUNDARY VALUE PROBLEMS 5e EDWARDS & PENNY

