

مختصر توصيف المقرر

(Course Information)

معلومات المقرر*

اسم المقرر:	المعادلات التفاضلية في الفيزياء
رقم المقرر:	فيز 2022
اسم ورقم المتطلب السابق:	حساب التفاضل والتكامل رياض 1022
اسم ورقم المتطلب المرافق:	--
مستوى المقرر:	الثالث
الساعات المعتمدة:	3 (0+0+3)
Module Title:	Differential Equations in Physics.
Module ID:	PHYS 2022
Prerequisite:	Calculus MTH 1022
Co-requisite:	--
Course Level:	3 rd
Credit Hours:	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	<p>Knowledge</p> <ul style="list-style-type: none"> Rename the most important definitions and concepts of differential equations as order-degree-linearity- homogeneity. Classify the DE, Linear, nonlinear, exact, homogeneous, Bernoulli, Ricataau, Clairrot, Cauchy-Euler differential equations and the power series solutions. 	1
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2	Cognitive Skills <ul style="list-style-type: none"> Using a several methods in solving DE. Apply different DE methods in physical problems. Introduce the physical problems in a mathematical model. Using power series to solve differential equations. 	2
3	Interpersonal Skills and Responsibility <ul style="list-style-type: none"> Interact professionally with others, to engage effectively in teamwork, and to function productively on multidisciplinary group projects. Develop in each student the good writing skills so that they are able to communicate effectively and clearly Develop in each student good oral communication skills so that they are able to communicate effectively with others 	3
4	Communication, Information Technology and Numerical Skills <ul style="list-style-type: none"> Develop the team working skills necessary to perform effectively. Develop the ability to argue scientifically with the instructor. Using the computer program to analyze the data, and make some simulation Search in the web for any updated information concerning the assigned experiment. Analyze the data with good mathematics and theory. 	4
5	Psychomotor 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 th 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 nd ed. (2017) ISBN-10: 3319502239	<i>Springer</i>	<i>Christian Constanda</i>	Differential Equations: A Primer for Scientists and Engineers
1 st de. (2004) ISBN-10: 0521533910	<i>Cambridge University Press</i>	<i>JAMES C. ROBINSON</i>	An introduction to ordinary differential equations.
5 th 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