



مدونة المناهج السعودية

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الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

مختصر توصيف المقرر

(Course Information)

معلومات المقرر\*

المعادلات التفاضلية الجزئية	اسم المقرر:
فيز 2062	رقم المقرر:
المعادلات التفاضلية في الفيزياء	اسم ورقم المتطلب السابق:
--	اسم ورقم المتطلب المرافق:
الرابع	مستوى المقرر:
(0+0+3)3	الساعات المعتمدة:
<b>Module Title:</b>	Partial Differential Equations in Physics
<b>Module ID:</b>	PHYS 2062
<b>Prerequisite:</b>	PHYS 2022
<b>Co-requisite:</b>	--
<b>Course Level:</b>	4 <sup>th</sup>
<b>Credit Hours:</b>	3 (3+0+0)

Module

وصف المقرر :

Description

This course enhances the ability of students to understand the basics of PDEs and implement this knowledge to model and solve a variety of problems. Students will acquire the knowledge to understand branches in physics, which use partial differential equations; students will develop the ability to solve partial differential equations, which are common in physics.

Module Aims

أهداف المقرر :

1	Understanding the most important definitions and concepts of partial differential equations.	1
2	Modelling physical phenomena with first and second order of partial differential equations.	2

Learning Outcomes:

مخرجات التعليم:

1	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Rename the most important definitions and concepts of partial differential equations.</li> <li>• Form the PDEs.</li> <li>• Classify the PDEs.</li> </ul>	1
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<b>2</b>	<b>Cognitive Skills</b> <ul style="list-style-type: none"> <li>Using several methods in solving PDEs.</li> <li>Apply different PDE methods in physical problems.</li> <li>Introduce the physical problems in a mathematical model.</li> </ul>	2
<b>3</b>	<b>Interpersonal Skills and Responsibility</b> <ul style="list-style-type: none"> <li>Interact professionally with others, to engage effectively in teamwork.</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
<b>4</b>	<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
<b>5</b>	<b>Psychomotor</b> Not applicable.	5

**Course Contents:**

محتوى المقرر:

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)
2	2	Classification and formation of PDEs.
9	3	First order PDEs- Solution using Lagrange's method.
9	3	Second order linear PDEs in several variables.
9	3	Physical applications using Separation of variables.
6	2	Some boundary value problems.
6	2	Eigen function Expansion method.

**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
(1993) ISBN-13: 978-0486676203	Dover Publications	Stanley J. Farlow	Partial Differential Equations for Scientists and Engineers
سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم المرجع Reference

1 <sup>st</sup> ed. (2016) ISBN-10: 3319020986	Springer	Peter J. Olver	Introduction to Partial Differential Equations
4 <sup>th</sup> ed. (2003) ISBN-10: 0130652431	Prentice Hall	Richard Haberman	Applied Partial Differential Equations: With Fourier Series and Boundary Value Problems