Hashemite University	Course Syllabus	**Partial Differential Equations** (11101341) 3 Credit Hours
Faculty of Science		**Pre-requisite: 11101203**
Department of Mathematics		**Summer semester 2021/2022**

Course Information	
Lecture's Time	10:40-12:55
Lecture Room	102 ل.ز
Instructor	Dr. Mohammad Safi
Office Location	Math 316
Office Hours	by appointment

Text Book : Partial differential equations for scientist and engineers, Tyn Myint-U and Lokenath Depnath, Birkhauser, 4th edition, 2007.

References(s)	1. Fourier series and integrals of boundary value problems, by J. Ray Hanna 2. Partial differential equations for scientist and engineers, Stanely J. Farlow, Dover Publication, 3rd edition, 1993.
Website	http://www.staff.hu.edu.jo/safi

Grading Policy:		**Participation and Exams:**
1st Exam	30%	Attendance is absolutely mandatory. Students who miss the class sessions without a compelling excuse will qualify the student to be dismissal.
2nd Exam	30%	
Other	0%	
Final Exam	40%	

Course Objectives
To show what partial differential equations are, and why they are useful and how they are solved with emphasis on the most important analytic tools in solving partial differential equations using: exponential method to find the general

solution, separation of variables and Integral transforms.
Teaching and Learning Methods
Introducing new definitions and using examples to illustrate new concepts. Giving examples and applications for some theorems and corollaries. Giving a sample assignment for each section. Discussing some of the students' solutions of some sample assignment.

Course Contents

Topics	***Week***
Orthogonal Set of Functions	1
Two-Point Boundary Value Problems	
Eigenvalue Problems	
Sturm-Liouville Theory	
Fourier Series	2
Introduction to Partial Differential Equations	
Mathematical Problems	
Linear operators	
Superposition	
Mathematical Models: Vibrating String and Membrane, Conduction of Heat, Waves in Elastic Medium.	3
Classification of Second Order Equations	
Canonical Forms	
General Solution	4
Separation of the Variables	
The Vibrating String Problem The Heat Conduction Problem Laplace Equation for a Rectangle	5
Laplace Equation for a Circle	
Laplace Equation for a Circular Annulus	
Poisson Equation	
Transforming Nonhomogeneous Problems into Homogeneous Ones	6
Solving More Complicated Problems by Separation of Variables	
Integral Transforms Methods	7
The Fourier Transform	
The Finite Fourier Transforms (Sine and Cosine Transforms) Fourier Transforms and its applications to PDEs	

The Laplace Transform	
The Laplace Transform and its applications to PDEs	