Birzeit University
Mathematics Department
SYLLABUS
First Semester 2019/2020
Instructor: Dr. Ala Talahmeh, atalahmeh@birzeit.edu
Course Code: MATH 332
Title: Partial Differential Equations (PDEs)
Room: S.A.HADI 276
Office Hours: See Ritaj

Objectives: The course aims to introduce basic concepts of existence, uniqueness and properties of solutions to first and second-order linear and quasilinear partial differential equations. Applications to the wave equation, the heat equation and the Laplace equation are considered.

Course Description: Fourier series and transforms. Introduction to partial differential equations and boundary value problems. Classification of linear second order PDEs. Separation of variables. Diffusion Equation. Laplace Equation. Wave Equation. Bessel and Legendre functions. Existence and Uniqueness.

Textbook: Advanced Engineering Mathematics by M.D. Greenberg, printice Hall: 1988.

References:

1. Advanced Engineering Mathematics (Fifth Edition, 2011) by D.G. Zill and W.S. Wright, International Edition
2. Beginning Partial Differential Equation. by P. O'Neil. (Second Edition, 2008)
3. Advanced Mathematics for Engineers by W. Kaplan, Addison- Wesley: 1981
4. Fourier Analysis with Applications to B.V.P.S by M.R. Spiegel, Shaum's Outline Series: 1974 Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons, 1983.

Topics Outline

Chapter 10: Fourier Series.
- 10.1: Introduction.
- 10.2: Even, Odd, and Periodic Functions.
- 10.3: The Fourier Series of a Periodic Function.
- 10.4: Manipulation of Fourier Series.
- 10.5: Vector Space Approach.
- 10.6: The Sturm-Lioville Theory.

Chapter 11: Fourier Integral, Fourier Transform.
- 11.1: Introduction.
- 11.2: The Heaviside and Dirac Functions.
- 11.3: Fourier Integral.
- 11.4: Fourier Transform

Chapter 13: Introductory Concepts.
- 13.1: Introduction.
- 13.2: Preliminary Concepts.
- 13.3: Second-Order Linear Equations

Chapter 14: Diffusion Equation.

- 14.1: Introduction.
- 14.2: Separation of Variables
- 14.3: Use of Sturm-Liouville Theory
- 14.4: Infinite and Semi-Infinite Regions: Fourier and Laplace Transforms

Chapter 15: Laplace Equation.

- 15.1: Introduction.
- 15.2: Separation of Variables.
- 15.3: Polar Coordinates
- 15.4: Fourier Transform

Chapter 16: Wave Equation.

- 16.1: Introduction.
- 16.2: Separation of Variables.
- 16.3: D'Alembert's Solution

Chapter 17: Bessel and Legendre Functions.

- 17.1: Introduction.
- 17.2: Bessel Functions.
- 17.3: Legendre Functions.

Existence and Uniqueness.

Grading Policy

1	Quizzes, Assignments, & Homeworks	**10%**
2	Two Hour Exams	**Max. 30%, Min. 20%**
3	Final Exam	**40%**