



Partial Differential Equations

Module Name: Partial Differential Equations Module Number: 250305

Level: 3

Credit Hours: 3 Credit Hours

Prerequisite : 250203

Lecturer (Dr. Khaled Hyasat, Associate Professor)

Office Number : 1015 Office Hours: 10:15-11:00 ,12:15- 13:15 (Sunday, Tuesday, Thursday)
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Module Coordinator: Dr. Khaled Hyasat

Aims :

This module aims to provide students with an introduction to partial differential equations , that contains the structure and the properties of solutions of PDE's and Fourier Series .It also covers the Sturm-Liouville theory and the eigenfunction expansions , as well as the Dirichlet problem for Laplace's operator and potential theory .

Teaching Methods:

Duration: 16 weeks in first semester, 48 hours in total

Lectures: 32 hours in total, 2 per week (including two 1-hour midterm exams)

Tutorials: 16 hours, 1 per week

Learning Outcomes:

At the end of this module, student will be able to:

- * Determine The Fourier series for any given function .
- * Solve the PDE's using the method of separation of variables
- * Solve the Dirichlet and Neumann Problems
- * Discuss the major properties of Boundary Value problems and Sturm-Liouville problems and their solutions .

Contribution to Program Learning Outcomes:

(A1, B1)

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Department: Basic Sciences



Module Outline:

Week	Date	Subject
(1)	25/02 – 01/03	Review to ODE
(2)	04/03 – 08/03	Two-point Boundary Value Problems
(3)	11/03 – 15/03	Fourier Series
(4)	18/03 – 22/03	The Fourier Convergence Theorem
(5)	25/03 – 29/03	Even and Odd functions
(6)	01/04 – 05/04	Separation of Variables; Heat conduction in a rod
(7)	08/04 – 12/04	Separation of Variables; Heat conduction in a rod First Exam will be held in this week
(8)	15/04 – 19/04	Other Heat Conduction Problems
(9)	22/04 – 26/04	The Wave Equation; Vibrations of Elastic String
(10)	29/04 – 03/05	Laplace's Equation
(11)	06/05 – 10/05	Boundary Value Problems; the Occurrence of two-point BVP
(12)	13/05 – 17/05	Sturm-Liouville Boundary Value Problems Second Exam will be held in this week
(13)	20/05 – 24/05	Nonhomogeneous Boundary Value Problems
(14)	27/05 – 31/05	Singular Sturm-Liouville Problems, Further Remarks on the method of Separation of Variables
(15)	03/06 – 07/06	A Bessel Series Expansion; Mean Convergence
(16)	10/06 – 14/06	Final Exams will be held in this period

Modes of Assessment:

Modes of Assessment:	Score	Date
First Exam	20%	
Second Exam	20%	
Assignment (Project / tutorial)	10%	
Final Exam (Comprehensive; written.)	50%	

* *Make-up exams will be offered for valid reasons only with consent of the Dean. Make-up exams may be different from regular exams in content and format.*

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Attendance Policy:

Lecture attendance is mandatory. Student is allowed maximally 15% absentia of the total module hours.

More than this percentage, student with an excuse will be drawn from the module. Otherwise, student will be deprived from the module with zero mark assigned.

Expected Workload

On average you should expect to spend at least (9) hours per week on this module.

Text book :

Title: Elementary Differential Equations and Boundary Value Problems , 8th Edition

Authors: William E. Boyce and Richard Dprima

Publisher : John Wiley

ISBN: **0-471-43338-2**

Title: Partial Differential Equations for Scientists and Engineers

Author : Stanley J. Farlow

Publisher : Wiley

ISBN: : **0-471-43338-1**

Title: Introduction to Partial Differential Equations

Authors: Yehuda Pinchover and Jacob Rubinstein

Publisher : Cambridge University Press

ISBN: **10 0-521-61323-1**