NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES
LAHORE CAMPUS

Differential Equations (Calculus-II)-MT 224 Outline according to OBE Spring-2020

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FILE CONTENTS

Outline of Differential Equations (Calculus-II)

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Signature for Final Approval

DEPARTMENT OF SCIENCES & HUMANITIES

National University

of Computer & Emerging Sciences

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Text Book(s)	**Title**	Thomas Calculus / A first course in Differential Equations (DE) with modeling applications / Differential Equations with boundary-value problems.
	Authors	G. B. Thomas / Dennis G. Zill (DE) (Latest Editions).
Ref. Book(s)	**Title**	Elementary Differential Equations (DE) with applications.
	Author	C. H. Edwards. David, E.

Week	Course Contents	Chapter	CLO
01	**Infinite Sequences and Series** 10.1 Introduction to Sequences 10.2 Infinite series	10 (13th Edition)	01
02	10.3 The integral test 10.4 Comparison tests	10 (13th Edition)	01
03	10.5 Absolute convergence; The ratio and root test 10.6 Alternating series and conditional convergence **Quiz#1**	10 (13th Edition)	01
04	10.7 Power series 10.8 Taylor and Maclaurin series	10 (13th Edition)	01
05	**1st Order Differential Equations:** 2.1 Basic concepts, formation and solution of differential equations by direct integration and by separating the variables. Direction Fields. 2.2 Separable variables.	2 (9th Edition)	02
06 (Mon-Wed)	**MID TERM-I**		
07-09	2.3 Linear Equations. 2.4 Exact Equations. **Solution by Substitution** 2.5 Equations (Homogeneous & Bernoulli's DE) reducible to linear equations & Riccati. 3.1 01st order ODE's arising from Real life problems. 3.3 01st order ODE's arising from Real life problems.	02 (9th Edition) 03 (9th Edition)	03-05
10-12	**2nd & Higher Order Differential Equations** 4.1 Initial and Boundary value problem, Existence of a unique solution. Homogeneous DEs', Linear Dependence and Independence. Wronskian and non-homogeneous Linear Differential Equations. 4.2 Reduction of order. **Quiz#2** 4.3 Homogeneous Linear Equations with Constant Coefficients. 4.4 Undetermined coefficients-Superposition approach. 4.5 The operator D, Inverse operator 1/ D, Solution of	04 (9th Edition)	06, 07

	differential equations by operator D methods, Special cases. 4.5 Undetermined coefficients-Annihilator approach. 4.6 Variation of parameters. 4.7 Cauchy Euler equation.		
13	**Partial Differential Equations** 12.1 Basic concepts and formation of partial differential equations. Linear homogeneous partial differential equations and relations to ordinary differential equations. 12.2 Classical Equations & Boundary Value Problems. 12.3 Heat Equation 12.4 Wave Equation 12.5 Laplace Equation	12(3rd Edition)	08
14 (Thu-Sat)	**MID TERM II**		
15-16	**Orthogonal Functions and Fourier Series** 11.1 Orthogonal Functions 11.2 Fourier Series **Quiz#3** 11.3 Fourier Cosine & Sine Series (Periodic functions and expansion of periodic functions in Fourier series and Fourier coefficients.) 11.4 Sturm-Liouville Problem.	11 (3rd Edition)	09
	Series Solutions of Linear Equations: (If time permits**)** 6.2 Solution about ordinary point & Singular points.	09th edition	
	FINAL EXAM		

Evaluation Scheme & Marks Distribution: Relative grading scheme will be used for final assignment of grades. Marks distribution is given below.

Assessment Tools	Total No.	Weightage
Quizzes	3 (at least)	10%
Assignments	3(at least)	8%
Homework	As per instructors advice.	7%
Mid Term Exam	2	25%
Final Exam	1	50%

Note:

1. **Reaching 10 minutes late after the class starts will not be considered present.**
2. **Late submission of home works will not be rewarded.**
3. **Relative grading scheme will be followed in the course.**

Important links: https://www.youtube.com/watch?v=8yEE2YURbAo&list=PLlXfTHzgMRUK56vbQgzCVM9vxjKxc8DCr&index=31