National University

Of Computer & Emerging Sciences

Karachi Campus

Course Outlines of BS (CS) Degree Program

Course Instructor	Nadeem khan	Semester	Summer 2021
Batch/Section(s)	Batch 2018,2019,2020 / Sections: 3A	Year	2021
Course Title	MT224 Differential Equations	Credit Hours	3
Prerequisite(s)	MT119- Calculus and Analytical Geometry	Course TA	

Text Book(s)

Title of book	Advance Engineering Mathematics, 6th edition
Author	*Dennis G.Zill*
publisher	John Wiley & Sons.

Reference Book(s)

Differential Equations and Boundary Value Problems 3rd edition,Edward penney,pearso

Introduction to Engineering Mathematics,H.K dass,S.chand.

Calculus by Howard anton 10th edition.

Course Description:

This course based primarily on differential equations. The focus of this course will be on the solution Of first and higher order differential equations and applications of ordinary differential equations (ODE's) to problems from the physical, biological, and social sciences.

Course Objective:

This course based primarily on differential equations. The focus of this course will be on the solution of first and higher order differential equations and applications of ordinary differential equations(ODE's) to problems from the physical, biological, and social sciences.

Tentative Lecture Schedule: **Advance Engineering Mathematics, 6th edition**

Week	Contents/Topics	Exercises	Questions
1	<u>Introduction to Differential Equations:</u> Differential Equations and their Classification Solutions or Integrals of Differential Equations Formation of differential equation. <u>Initial Value Problems:</u> First and Second Order IVPS	1.1 1.2	1-8,11-18 21-24,27-32 37,38 1-14
2	<u>Solution of First Order Differential Equations:</u> Variable Separable form. Linear Differential Equations	2.2 2.3	1-30 1-24,25-30,31-34
3	Exact and Non Exact form (Integrating Factor)	2.4	1-16,21-25,30-37
4	Solution by substitution (Homogeneous) Bernoulli Differential Equations	2.5	1-30
5	Applications of First Order Differential Equations(Linear Models) **Growth & Decay ,Newton Law of cooling, Series circuits**	 2.7	Example: 1,2,4,6 2-4,13-15,31-33
6	Midterm 1		
7	<u>Higher Order Differential Equations:</u> Initial and Boundary value problem. Homogeneous DEs', Linear Dependence and Independence, Wronskian Non-homogeneous Linear Differential Equation. Reduction of order	3.1 3.2	1-4,7,8,13,19, 23-30,31-34 1-14
8	Homogeneous Linear Equations with Constant Coefficients (complementary solution)	3.3	1-14,15-25,29-40
9	Undetermined coefficients Method (Superposition approach) Particular Solution	3.4	1-25,27-30 37-40
10	Variation of parameters. Cauchy Euler equation.	3.5 3.6	1-18,19-22,25 1-15,19-24,25-30
11	Partial derivative Relative Extrema F(x,y) and saddle point Multiple integration	13.3 13.8 14.1	1-9,81-84 9-18 1-8
12	Midterm 2		
13	<u>The Laplace Transform:</u> Laplace transform Inverse Laplace transforms Transforms of Derivatives	4.1 4.2	1-36 1-30,31-40
14	Translation on the s-axis and t-axis Derivatives of Transform, Transforms of Integrals, Convolution Theorem	4.3 4.4	1-18,21-30,37-48 1-10
15	Application of Laplace transforms The Dirac Delta Function	4.5	1-10
16	Numerical solutions of ODE(if time permits)		

Marks Distribution:

Particulars	% Marks
1. Assignments	20
2. First Mid Exam	15
3. Second Mid Exam	15
4. Final Exam	50
Total:-	**100**

Important Instructions to be followed for this Course

- Be in classroom on time. Any student who arrives more than 5 min late in the class would be marked LATE. Anybody coming to class more than 15 minutes late will be marked ABSENT.
- Turn off your cell phones or any other electronic devices before entering the class.
- Maintain the decorum of the class room all the time.
- Avoid a conversation with your classmates while lecture is in progress.
- Use parliamentary language in the class room as well as in assignments. Refrain from usingimpolite, vulgar or abusive language in the class room as well as in class presentations and assignments.
- Submit your assignments on time, no assignment will be accepted after the deadline.
- There would be no re- take of any quiz.

Instructions / Suggestions for satisfactory progress in this course:

- On average, most students find at least three hours outside of class for each class hour necessaryfor satisfactory learning.
- Chapters should be read and homework should be attempted before class.
- Do not get behind. You are encouraged to work with other students. Plus, I am always availableduring office hours to help you.
- The homework assigned is a minimum. You may always work extra hours on your own.
- Use the few minutes you usually have before the start of each class to review the prior meetings'notes and homework. This will save us valuable in-class time to work on new material.
- Develop a learning habit rather than memorizing.
- Work in groups, whenever appropriate.
- Apply the learned principles and gained knowledge.
- Be creative in thinking, but stick to the topic assigned for discussions, assignments andpresentations.
- Always bring your text Books with you in the class.

Note: Students are welcome all the time to get help from the Teacher.

Signature: *Nadeem khan*
                    _____