



Course Outlines of BS (CS) Degree Program

Course Instructor	Muhammad Jamil / Ms Fareeha Sultan / Ms Amber Shaikh	Semester	Spring
Batch/Section(s)	2018 / Sec A, B,C,D,E,F,G,H	Year	2019
Course Title	MT224 Differential Equations	Credit Hours	3
Prerequisite(s)	MT119- Calculus and Analytical Geometry	Course TA	

Text Book(s)

1.Title of book	Differential Equations with Modelling Application, 9 th edition		
Author(s)	Dennis G.Zill	Publisher	John Wiley & Sons.

Reference Book(s)

Advanced Engineering Mathematics 10 th edition		
Erwin Kreyszig	Publisher	McGraw-Hill
Calculus ,10 th edition		
Anton, Bivens, Davis	Publisher	John Wiley & Sons
Advanced_Engineering_Mathematics,_7th_edition		
Peter V O'Neil	Publisher	Cengage

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 , Students are expected to learn function of several variables ,Power series and PDE's

Course Objective:

This course is a continuation of the prerequisite Calculus I to further develop and encourage students to think visually, analytically and numerically the real world problems. Students will be able to explore and explain a variety of differential equations and calculus concepts and applications in writing exercises.

Tentative Lecture Schedule:

Week	Contents/Topics	Exercises	Questions
1	<u>Introduction to Differential Equations:</u> Differential Equations and their Classification Order, Degree and Linearity. Solutions or Integrals of Differential Equations Formation of differential equation. First and Second Order Initial Value Problems:	ZILL 9th ed 1.1 1.2	 1-8,11-18 21-24,27-32 37,38 ,44,47 1-14,31-33
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	1-16,21-25,37-30
4	Solution by substitution (Homogeneous) Bernoulli Differential Equations	2.5 2.5	1-14,23-30 15-22
5	Applications of First Order Differential Equations (Linear Models) Growth & Decay ,Newton Law of cooling, Series circuits	3.1	2-4,13-15,31-33
6	Midterm 1		
7	<u>Higher Order Differential Equations:</u> Initial and Boundary value problem. Linear Dependence and Independence, Wronskian Homogeneous and Non-homogeneous Linear Differential Equation. Reduction of order	4.1 4.2	1-4,7,8,13,19, 23-30,31-34 1-14
8	Homogeneous Linear Equations with Constant Coefficients (complementary solution) Undetermined coefficients Method (Superposition approach) Particular Solution	4.3 4.4	1-25,29-40 1-30 , 37-40
9	Variation of parameters. Cauchy Euler equation.	4.6 4.7	1-18 1-15, 25-28
10	<u>Function of Several variables</u> Partial derivative ,Mixed derivatives , Chain rule ,Tangent planes and differentials. Extreme values and saddle points.	ANTON 10th ed 13.3 13.5 13.8	1-10,25-40 1-10,20-30 9-15
11	Midterm 2		
12	Introduction of double integrals	14.1 14.2	1-16 1-10
13	<u>The Laplace Transform:</u> Definition of Laplace transform	ZILL 9th ed 7.1	1-5 , 11-36
14	Inverse Laplace transforms Transforms of Derivatives (Application)	7.2	1-30,31-40
15	Power series , Taylor and Maclaurin series	ANTON 10th ed 9.8	1-22
16	<u>Partial Differential Equation:</u> Basic concept of partial differential equation methods of separation of variables, Heat ,wave and Laplace equation.	If time permits (optional)	

Grading Criteria:

Marks Distribution:

Particulars	% Marks
1. Class participation/Attendance	05
2. Quizzes (At least three)	10
3. Assignments (At least three)	05
4. First Mid Exam	15
5. Second Mid Exam	15
6. 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 using impolite, 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 necessary for 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 available during 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 and presentations.
- Always bring your text Books with you in the class.

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

jamilusmani

Signature: _____

Date:15-03-2019